THE IRON AGE

A Review of the Hardware, Iron, Machinery and M[illegible] Trades.

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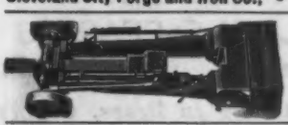

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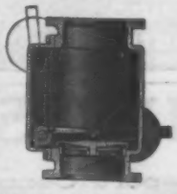

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The Locomotive of To-Day. Reprinted with revisions and additions from the "Locomotive Magazine." Second edition. 8vo. Cloth. 200 pages, 37 illustrations. 16 half-tone plates. London, 1903.....$1.00
For sale by David Williams Co., 232 William St., N.Y.

THE IRON AGE

THURSDAY, APRIL 7, 1904.

The Pfeiffer Spring Motor.

A Mechanism for the Storage of Potential Energy.

The term spring motor as applied to the mechanism illustrated herewith is used in a special sense which needs some explanation at the outset. It should not be confounded with a motor such as is used in driving a phonograph or a clock, where the winding is accomplished in a few moments and the unwinding covers a period of considerably greater duration. With this machine the winding and unwinding are going on practically simultaneously as long as it is in operation, and the whole object of the apparatus is to provide means for equalizing the input and output of energy, so that being applied in an intermittent or inconstant manner it may be delivered at a uniform rate and constant speed. In other words, it provides for the transformation of surplus kinetic energy into potential energy, to be reconverted and delivered as kinetic energy when the input falls below the output. In this respect it may be compared to a storage battery as used to balance the load on a power plant. Or, as another comparison, this motor is to the passage of mechanical energy what a reservoir is in hydraulics or a receiver in pneumatics, an accumulator to smooth out fluctuations. It is the invention of Clifton, Pfeiffer, and is manufactured by the New Britain Hardware Mfg. Company, New Britain, Conn. While it was designed primarily for use in connection with automatic piano players, it is also adapted to a much greater field of usefulness; in short, for any use where a supply of power at a uniform rate is required but where the source is incapable of the necessary close regulation and constant speed. In the present case the winding is accomplished by foot power, and it will be readily appreciated that it is not within the ability of the human machine to act with the precision that is necessary to supply power at an absolutely uniform rate. The particularly ingenious feature of this motor is the arrangement whereby the leverage of the foot treadles is altered according to the state of the spring winding, so that the same amount of power may be exerted when the spring is nearly wound as when it it but partly so. This was not the main object, however, so much as it was to prevent excessive winding. That point is safeguarded so that as the winding proceeds the rate of winding decreases until, when the spring is completely wound, it is impossible to apply further power through the treadles.

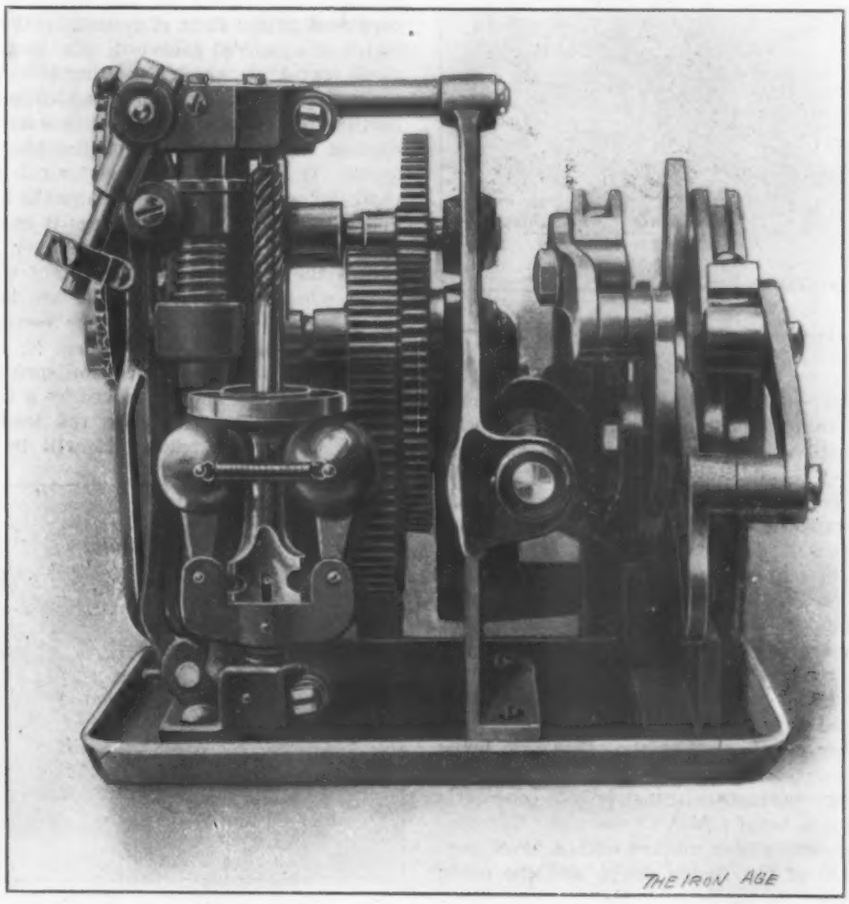


Fig. 1.—End View of the Spring Motor, Showing Governor.

The external appearance of the machine is shown in the three half-tones, Fig. 1 being an end view, Fig. 2 a three-quarter view showing one side, and Fig. 3 a three-quarter view of the opposite side. The construction of the winding feature and speed governor is shown in Figs. 4 and 5. It will be seen that the motor has three shafts driven by a train of gears. At the rear, mounted in bearings separate from the main frame of the motor, is the winding shaft, on the left end of which is mounted the spring drum, and upon the right end the winding clutches, and in front of this are two other shafts, the first being called for convenience the power shaft and the second the speed shaft. A large spiral gear on the

speed shaft engages a smaller spiral gear, which is cut in the vertical shaft of the governor. The two sprockets at the left, each of which is loosely mounted on its shaft, are nonessential parts of the mechanism, except in its application to a piano player, where they are used for turning the spools and for winding and rerolling the music record. Being connected to the spool shafts by light chains, the one on the power shaft winds the music sheet while it is playing and the one on the speed shaft rerolls it. The speed shaft runs eight times faster than the power shaft, and the sprockets are driven through clutches so arranged that when one is engaged the other is thrown out.

The spring winding mechanism consists of two clutch wheels fast on the shaft, each clutch having an arm loosely mounted on its hub, as seen in Fig. 3. The con-

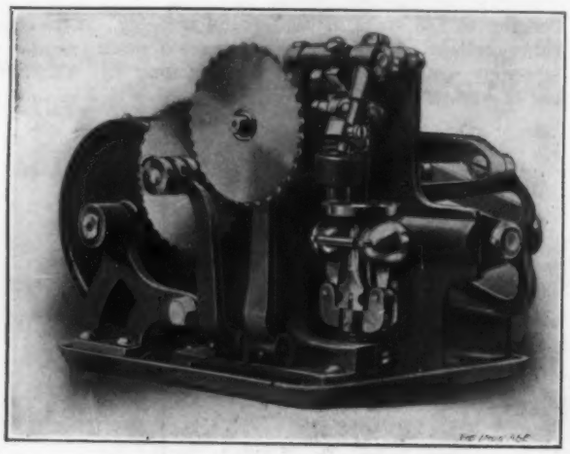


Fig. 2.—Perspective from Governor Side.

struction of this part is best indicated in Fig. 4, A being the arms and B rollers engaging wedge shaped blocks, C, which fit into bevel grooves in the clutch rims. A slight pressure of the roller on its wedge block provides a strong holding power. The free ends of the arms are connected to levers D, to which the pedals are attached. The levers are formed with slots near the ends, where they connect to the clutch arms, and in these slots are rollers mounted on studs in a movable fulcrum block which provides support for both levers. In winding the motor the pedals are depressed alternately, causing the slotted levers to rock on the fulcrum, lifting the ends of the clutch arms and rotating the clutch wheels. The spring is prevented from unwinding during the reverse movement of either clutch arm by the other arm being then in action.

The equalizing mechanism consists of concentric shafts, each having a bevel pinion at one end. The pinion on the power shaft sleeve meshes with a bevel gear secured to the hub of the spring drum, and the other pinion meshes with a bevel gear on the winding shaft. For part of its length the inner shaft is threaded and works in the part nut G, which extends through a slot in the outer shaft. The fulcrum block has an offset sleeve mounted on the equalizer shaft, which has an internal annular groove which engages a lug projecting from the nut. It will be seen from this construction that the rotation of the spring drum tends to move the fulcrum in one direction and the rotation of the winding shaft in the opposite direction, but if both rotate simultaneously at the same speed the fulcrum will remain stationary. The relation of the sizes of the gears and the pitch of the screw are such that by means of the shifting fulcrum the leverage is automatically maintained at a value which is in direct proportion to the tension of the spring. The bevel gear on the winding shaft will revolve the inner shaft of the equalizer while the winding is taking place, if the motor is not running, and the screw will move the fulcrum on the rocking levers, thus changing the leverage on the winding mechanism with the increasing tension of the spring until, when it is completely wound, the fulcrum has been shifted so near the end of the clutch arms that winding is not effected by further operation of the treadles. When the motor is started the bevel gear on the spring case revolves the outer shaft of the equalizer, moving the fulcrum in the opposite direction. If the winding equals the speed of the motor the fulcrum will remain stationary, as before stated, and the motor may run indefinitely by maintaining the speed of the winding. If desired, the winding may be made to exceed the unwinding and so accumulate power which may be used while the pedals are not in use.

The motor is controlled by means of a quick acting centrifugal governor of novel construction, which enables the operator to vary the speed as desired and responds instantly to any variation. The construction of the governor is shown in Fig. 5. The vertical shaft, which was previously referred to as being driven by a spiral gear at its upper end, is pinned near the bottom to a pair of arms, the outer ends of which are pivoted to the ball arms. The balls are normally constrained toward one another by spiral springs, but when in motion centrifugal force throws them apart with the effect that the sleeve H is raised by short arms which are part of the ball levers. The upper end of the sleeve is expanded in the form of a disk, in the upper surface of which is a tapered groove, I. The conical pin J, the vertical travel of which is adjustable, projects into the tapered groove of the disk and causes friction in proportion to the upward pressure exerted by the sleeve against it. The position of the pin J determines the speed. If it is raised the motor can increase its speed until the centrifugal force throws the balls further apart and raises the sleeve and brings it once more in contact with the pin. In the same manner lowering the pin causes the disk to come in contact with it at a lower speed when the governor balls are less distended. In the governor, as illustrated, the vertical adjustment of J is accomplished through a cam, K, the follower being held against it by a compression spring surrounding the pin. The cam K may be moved by a lever secured to its hub, to which is attached a rod leading to a position within convenient reach. It will be seen, then, how

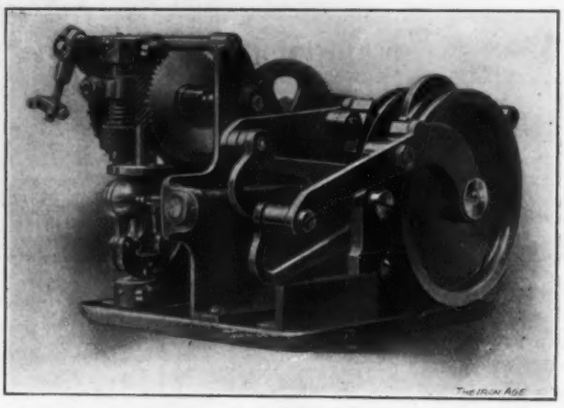


Fig. 3.—Perspective from Side of the Winding Mechanism.

perfectly the machine is under control at all times, for, with the winding automatically cared for, the operator need give no more heed to his feet than he would in driving a bicycle, and may confine his attention to watching and regulating the speed.

The Hendey Machine Company Not Sold.—The Hendey Machine Company, Torrington, Conn., have not disposed of their machine tool business to the Prentice Brothers Company, as was stated in these columns last week. Through an unfortunate blunder in our composing room the first line of two separate items was transposed, which led to this regrettable mistake. The incorrect paragraph was intended to announce the sale by the Johnson & Prentice Company, Worcester, Mass., of their entire machine and tool business to the Prentice Brothers Company of that city. We trust that the error has not caused any trouble or serious annoyance to the parties whose names were thus unintentionally confused.

"Nickeloid," A Nickel Coated Sheet Zinc.

About the middle of the nineteenth century the process of depositing nobler metals on baser ones for the purpose of preserving the same as well as adding to the appearance became a practical art. Silver and gold were the first to be adopted, as they gave greater opportunity for profits.

The first plating was done by batteries and was necessarily expensive and unsatisfactory, especially where large work was done. The invention, however, of dynamos with a low voltage suitable for depositing metals (about 6 volts) solved the problem and made it practical to plate large work, such as parts of stairways, metal ceilings, &c. Brass and copper were the first to be coated with nobler metals, such as nickel, gold and silver, and as the solutions made for this purpose were suitable only for depositing on these metals, it was customary to plate iron, zinc, &c., with copper before depositing nickel, silver, &c., on them. This led to the belief that no other metal except copper could be deposited direct on zinc or steel, and when a coating of nickel, for instance, was desired, a previous coating of copper was resorted to, which, of course, increased the cost of plating considerably. As the importance of the art grew platers and chemists devised new processes to plate direct, and to-day all up to date factories do the work in this way.

The demand of late years for small articles nicely polished and plated has developed a new industry, that of manufacturing nickelized sheet zinc. This metal is admirably adapted for use in manufacturing ice box linings, toys, mouth organs, reflectors, house numbers, bottle caps, metal signs, buttons, dog collars and thousands of other articles. The great advantage of nickelized zinc is its low cost and durability. Zinc, as is known, is proof against rust, though liable to tarnish; but when coated with nickel, which is the least liable to tarnish of all metals except gold, and nearly equal to the same in this respect, it will keep its bright polished appearance for years.

It is well known to manufacturers that the principal cost in plating and polishing small articles is the labor. By plating and polishing the large sheets automatically before the articles are stamped in polished dies the cost is reduced from one-half to sometimes one-fifteenth of the regular cost.

This industry originated in Germany, and German manufacturers, who moved to this country to avoid the tariff on their articles, imported it from there. This led to domestic manufacture, which at first was only partly successful, owing to the difficulty of obtaining a soft adhesive coating of nickel which would not peal or crack in working. A heavy deposit of nickel will turn grayish in stamping owing to numerous little cracks too small to be seen by the naked eye.

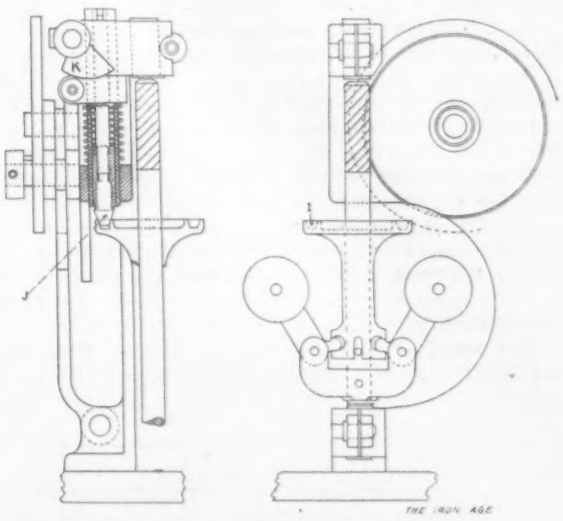


Fig. 5.—Detail of the Governor.

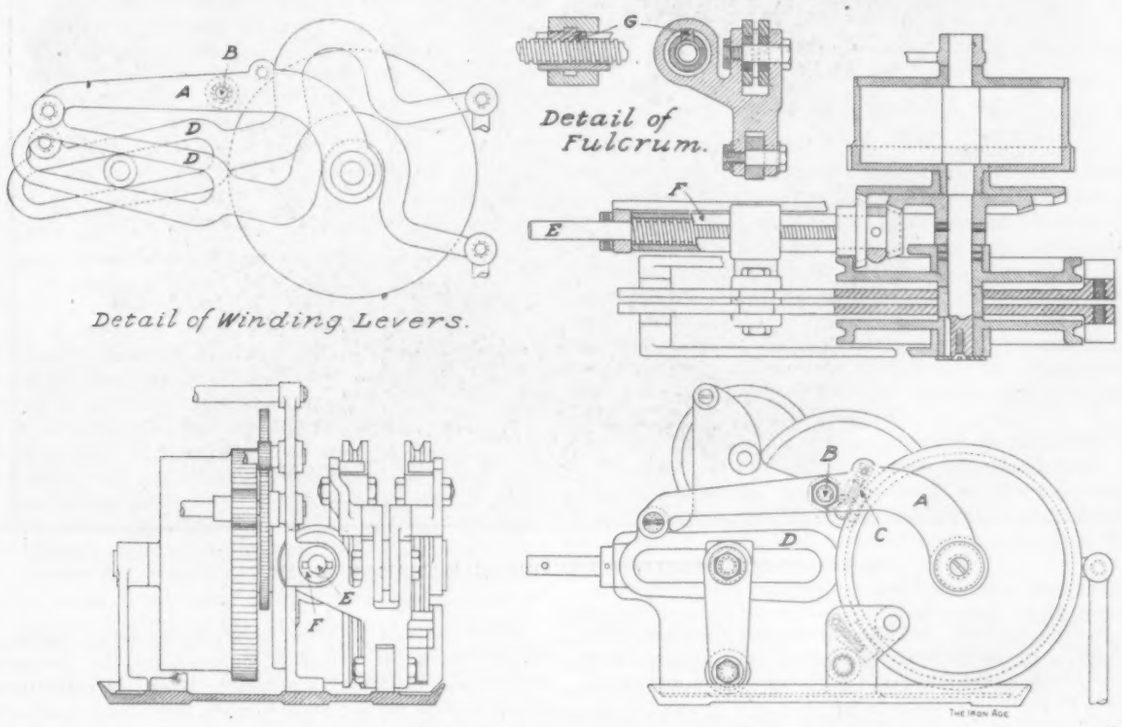


Fig. 4.—Detail of the Construction of the Winding Mechanism.

THE PFEIFFER SPRING MOTOR.

The most serious obstacle in plating zinc with nickel is its liability to be attacked by acids and alkalies, and even a neutral solution of nickel ammonium sulphate ($Ni\ NH_4SO_4$) will attack zinc. When an attempt is made to plate zinc in this solution, which is now universally used as the standard for depositing nickel on bases other than zinc, it prevents the nickel from becoming alloyed with the zinc, and a resistance is set up against the current by the action of the sulphates on the zinc which requires a strong current from the dynamos to overcome. If not overcome the articles in the bath turn black instead of being coated wtih nickel. On the other hand, if the current is strong enough to overcome these difficulties, new ones are encountered by getting what is known to the trade as a "burnt deposit" on parts of

the work nearest the anodes, where the current is the strongest. This deposit is very difficult to polish and in extreme cases cannot be polished at all.

As the difficulties encountered in first attempts of direct nickel plating on zinc were too numerous to make the process practical, a previous coating of copper was resorted to. This, however, was never entirely practical, as, in the first place, it increased the cost and also made the work more complicated, leaving more liability of defective work. In working sheets manufactured by this process the nickel has been frequently found to peal off the copper deposit, which, of course, makes the article unfit for use; besides, a nickel deposit on copper has, when stamped, the grayish appearance already alluded to. The sheets prepared in this manner can always be told by the black sulphide formed on the back in the nickeling process, while those plated direct have the natural color of zinc.

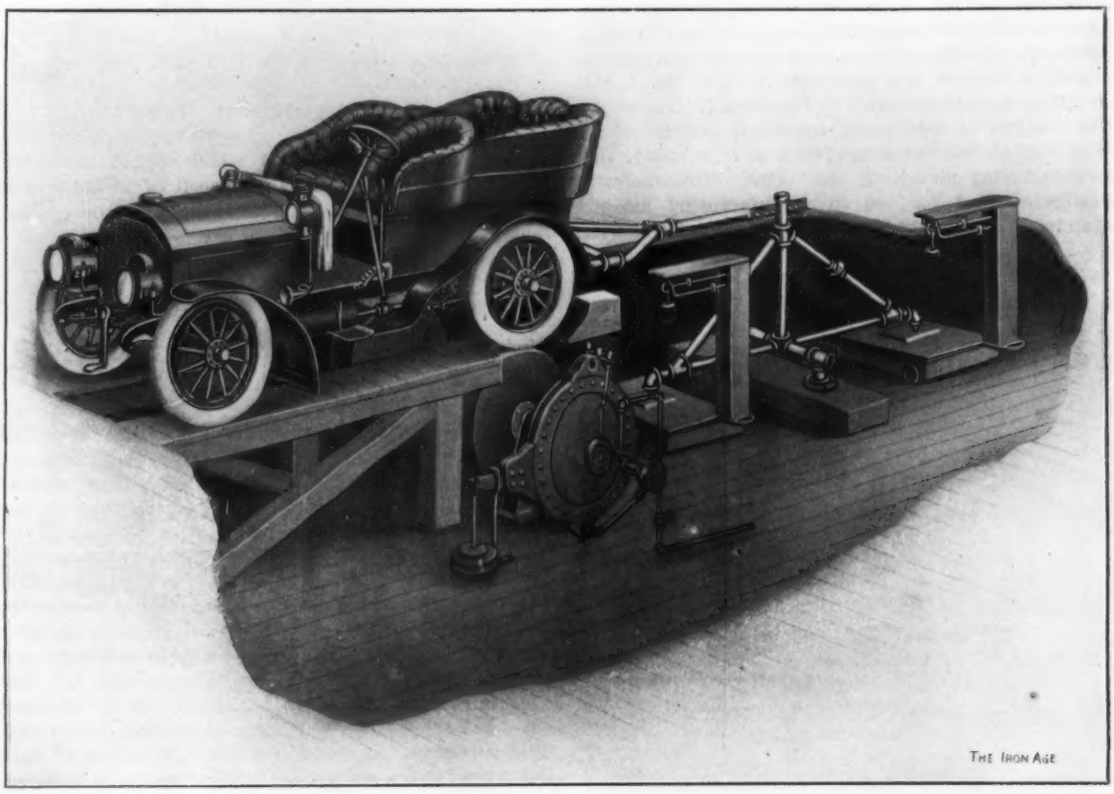
The American Nickeloid & Mfg. Company, Peru, Ill., are the originators of nickel coated and polished sheet zinc in this country, having engaged in business four years ago. By persistent efforts they have during their existence continually improved the product and decreased the cost of manufacture.

Their success in this was not, however, complete until about a year ago, when their chemist discovered a solution for depositing nickel direct on zinc whereby a soft deposit can be had which is perfectly alloyed to the zinc base. Since the adoption of this process the old complaints from customers of goods that would peal or had a brittle deposit is unknown.

Fire at Rankin Works.—On Monday morning, April 4, the wire nail factory at the Rankin Works of the American Steel & Wire Company, at Rankin, Pa., was completely destroyed by fire. The fire was confined entirely to the wire nail mill, none of the other departments of the plant being injured in any way. With numerous other wire nail plants available, the American Steel & Wire Company will suffer no delay whatever in the filling of orders. The burned portion of the Rankin Works will be rebuilt as fast as possible.

An Automobile Testing Equipment.

Judging from statements made by those who are in a position to know, there has never been a thoroughly satisfactory standard basis upon which to compare the various makes and types of automobiles. To be sure, there have been plenty of road tests for speed and endurance, which may be quite sufficient for the owners, but among engineers in this profession they mean little, as they do not indicate in what direction mechanical improvement is needed. In outdoor tests there are certain conditions which affect the results that cannot be eliminated, and, moreover, there is no chance to make use of instruments having a nice degree of refinement. One annoying result of the present lack of a standard rating is that when a maker describes a machine as one of 20 horse-power, it may mean that that is the maximum capacity of the engine or motor, or it may mean its normal capacity, or it may mean the estimated capacity at the driving wheels based on the tractive effort.



THE WORCESTER INSTITUTE AUTOMOBILE TESTING PLANT.

With the end in view of attaining some system of standardizing the rating of automobiles the Worcester Polytechnic Institute, Worcester, Mass., is establishing an automobile testing station, with the intention of using it in regular experimental laboratory work, and also for a certain amount of commercial testing. A sketch of the proposed plant shown in the accompanying illustration is from the designs of Prof. C. M. Allen of the department of mechanical engineering. It will be located in the mechanical laboratory on the ground floor, and arranged so that an automobile may be run directly into the building and into position for the test.

The testing apparatus comprises a shaft supporting two large pulleys or drums 24 inches or more in diameter, upon which the rear wheels of the automobile will rest. The shaft projects beyond the pulleys for the attachment of an Alden absorption dynamometer, and a traction dynamometer will be placed back of the machine and connected to its rear axle or driving shaft, so that a pull in either direction can be accurately measured on the platform scales shown in the drawing. The Alden dynamometer will furnish the loads required in testing, and may also be used to check the results ob-

tained by the traction dynamometer. Revolution counters and tachometers will indicate the speed and the equivalent distance travel.

In the tests the most important value to be determined is the power delivered at the driving wheels, but where more complete tests are wanted the engine may be indicated or power may be applied from some outside source through a transmission dynamometer to get the friction load and show what power is used when the engine is running idly with the machine standing still. For the determination of efficiency a test of short duration may be made, and for endurance, tests covering a longer period may be run with varying loads within the power limits of the automobile. The results obtained from each test will be plotted, giving curves showing the relations between various quantities, such as the actual horse-power applied at the rim of the driving wheels and the speed, the fuel consumed per horse-power per hour and the distance covered, or other relations similar to those used in the standardization of steam or gas engines. It has not been fully decided just what relations will be selected, but whatever they may be the same ones will be used in all tests as the basis of standardization.

The Polytechnic station, as planned, is similar in principle to a locomotive testing station, where one of the chief values to be determined is the draw bar pull—*i. e.*, the pull required of a locomotive to draw a train. That which corresponds to the draw bar pull of an automobile is entirely consumed in overcoming resistance and in accelerating the speed, and it was the main purpose in designing this station to afford means of measuring this quantity. The driving wheels rest upon pulleys which represent the road bed, and are large enough to reduce slip to a degree corresponding to that existing on the road. When the driving wheels are revolving in a direction to send the machine forward the tractive effort is registered on one set of scales, and when the machine is reversed, on a second set of scales. The various loads which must be applied to produce an equivalent of hill climbing can be accurately determined by adding corrections for friction, &c., to the theoretical equivalent of the power required to ascend a hill of a certain elevation, which is the amount necessary to lift the weight of the machine straight upward the same distance in the same time. It is planned to check the hill climbing loads by dynamometer tests on the road. Throughout the tests corrections will be applied to the results as in all other laboratory work.

It is believed that the outcome of these tests will be the establishing of a satisfactory standard which will be not what the engine can develop, but what the engine can deliver at the rim of the driving wheel after deducting the energy necessary to overcome the friction of the transmission gearing and all other mechanism not used directly for propelling. The standard, according to this scheme, would then be the draw bar pull at a given speed and could readily be reduced to horse-power. Automobile manufacturers who have been acquainted with the plan proposed by the Worcester Polytechnic Institute are showing considerable interest in it, for if it proves successful such a testing plant will be well worth having in their own establishments as a substitute for present means of automobile testing, which they themselves acknowledge are rather crude.

The Decay of Metals.

An elaborate report with a series of microphotographs on the decay of metals has been submitted to the Institution of Civil Engineers by James Tyler Milton and William J. Larke. In the introduction they say:

In many constructions the choice of some of the materials used is determined more by their durability under conditions of working than by their strength or other qualities, a more expensive and weaker material being chosen in preference to a cheaper and stronger, on account of its resisting corrosion better than the latter. Examples of this are afforded by the use of copper, brass, gun metal, or some of the special bronzes, in places where, except for their want of durability, the stronger and cheaper iron or steel would be preferable. The ordinary oxidation of iron and steel will not be dealt with; but a deterioration which sometimes occurs in cast iron and other metals, from causes which are to some extent obscure, will be considered. This deterioration will be generally referred to as decay.

As indicating the important bearing of the subject upon practical work, the following examples of deterioration may be mentioned:

1. The pitting of the tubes of marine surface condensers, which is a source of frequent trouble to marine engineers.

2. The decay of brass or yellow metal bolts in composite vessels, and in the underwater fittings of iron and steel ships.

3. The decay of the brazing metal in copper steam pipes.

4. The deterioration, as distinguished from oxidation, of cast iron used for parts of marine engines, and also for other appliances which are in frequent or continuous contact with sea water.

5. The decay of some propellers made of certain bronzes, when fitted to copper bottomed vessels.

The most serious feature of such deterioration which has been observed is that the action to which it is desired to call attention seems to be erratic; considerable trouble arises in certain cases, while in others, under similar conditions, no such results occur. Further, the action often proceeds to a considerable extent before ordinary examination will reveal it, because the metals when deteriorated preserve their original external appearance.

Summarizing the whole subject, it would appear that:

1. Decay is more frequent in metals which have a duplex or more complex structure than in those which are comparatively homogeneous.

2. Decay is due to a slower or less energetic action than that causing corrosion; moreover, it requires an action which removes part only of the constituents of the metal, whereas corrosion removes all the metal attacked.

3. Both decay and corrosion may result from chemical action alone, or from chemical and electrolytic action combined.

4. Pitting, or intense local corrosion, is probably often due to local segregation of impurities in the metal; but it may also in some places be due to favorable conditions furnished by local irregularities of surface or structure producing local irregularities in the distribution of galvanic currents.

5. For brass exposed to sea water, tin is distinctly preservative, while lead and iron are both injurious, rendering the alloy more readily corrodible. The percentage of the two latter metals should therefore be kept as low as possible in all brass intended for purposes where contact with sea water is inevitable.

6. With a view to obtain a minimum of corrosion, the internal surfaces of condenser tubes should be as smooth and uniform as possible; and in order to insure this condition the cast pipe from which they are drawn should be smoothly bored inside, either before the drawing is commenced, or in an early stage of the process, as is done in the manufacture of brass boiler tubes.

7. The experiments with an applied electric current show that electrolytic action alone, even where exceedingly minute currents are employed, may result in severe corrosion or decay. Every effort, therefore, should be made to prevent such action by careful insulation of all electric cables. Where galvanic action is inevitable, through the proximity of different metals exposed to the same electrolyte, the currents resulting should be neutralized by the application of zinc plates in the circuit, so arranged that they will be negative to both of the other metals.

The Hendey Machine Company, Torrington, Conn., have brought suit in the United States Circuit Court at Boston against the Prentice Brothers Company, Worcester, Mass., alleging an infringement of a patent on a quick change back gear speed device for engine lathes.

High Speed Steels.*

BY WILLIAM LODGE, CINCINNATI, OHIO.

High power cutting steels have been, are now, and will be in the future responsible for a greater onward and upward movement in the industry of machine making. The possibilities for machining metals, particularly so far as lathes are concerned, have been increased at least fourfold in the manipulation of wrought iron and steel, and at least threefold in the working of castings. To obtain full benefit, however, of the utility of the steels, it has become necessary, in order to equalize all the conditions, not only to redesign the machines themselves, but also to rearrange the old methods of both holding and driving the work. New methods of mounting and holding, as well as dressing and grinding, the tools are demanded, and while this may not apply so very seriously to small jobbing shops, it is one of the most significant questions that manufacturing concerns have to deal with.

Acceleration of Pace Brings Great Changes.

There has never been a period in the history of the machine making industry comparing with the present in the matter of acceleration of pace of whole establishments. This has been brought about by the advent of high speed steels. Manufacturing establishments that formerly got along reasonably well with the old methods of handling, storing, distributing and succession of the work in course of construction, will find it necessary to make a complete change in order that the various processes may uniformly keep abreast with each other in the rapid movement of the work going through the factory. High class mechanical engineers are necessary in order to lay out suitable stock rooms to receive in their proper proportion all goods that come under the class of merchandise and that are bought ready to go into the machines, such as cap screws, set screws, nuts, bolts, washers, taper pins, name plates, index plates, &c.

Other means will become necessary for storing castings, both large and small; also the means of taking care of bar stock, covering all the different grades and shapes, such as square and flat cold rolled, square and flat rough stock, &c. They should be arranged in such a manner that even boys or men of light build may readily handle them from the rack to the machines and out again. The stock room man must be in evidence, as must the receiving clerk, the routing official, for routing the work through the establishment and the conveying system for delivering the goods from the yards to the cranes of the shop and for rapid distribution to and from the various machines. Better arrangements must be had for laying out for tools throughout the factories, leaving more space for work around them. In this respect an utter and entire change will be necessary. Standard gauges and measuring instruments of all descriptions must be provided, and duplicate part systems of manufacture, making it possible for every piece to be made entirely without reference to the piece to which it is assembled must be extended.

Millions of dollars that have been expended in the various features above described and rendered obsolete by changed conditions must now be given careful attention, and these millions must be saved in order to maintain the United States in the foremost rank of manufacturing nations.

All our manufacturers will find it necessary to inaugurate and carry out a most vigorous campaign in their establishments, covering not only the conditions named, but also the still more important ones of equipping with the up to date appliances necessitated by the procurance of all the benefits conferred by the high speed steels.

New Methods of Driving and Chucking Required.

The following statements will give some idea of the possibilities along these lines as taught by the experiences in our own establishment.

In testing some of the machines designed especially for high speed work our company have expended thousands of dollars in order to determine just the kind of drive that must be applied where motor drives cannot be used and we have met with many and great surprises in conducting these various experiments.

Speaking of lathe work, the old time thrust bearing, with all the frictions which had been incorporated into the former designs, is found to be a great barrier to the use of high speeds. New designs have become necessary in order to obtain means of applying the power so as to deliver it to the cutting tool itself with the least possible expenditure in friction. In conducting these several experiments we used a 30 horse-power motor with an ammeter attached (so that the power could readily be read by observing the finger of the ammeter) and found through the mere matter of friction alone a diminution of more than one-half of the horse-power. I mean by this that if sufficient speed is applied to the old style design of engine lathe to take advantage of the high speed steels, the friction engendered through the running of the cone pulley on the spindle and the thrust bearings and centers consumes an amount of power that almost at once makes the power plant inadequate to the calls made upon it, in the attempt to take advantage of the possibilities in the steel. New and better designs were found to be necessary.

Then comes the necessity of testing the value of the different steels offered, and while these have varied in the past year to a very large extent, the tool steel manufacturers are, all of them, working with the utmost care and intelligence, and our later experiments have shown a wonderful improvement in uniformity and staying qualities. For reasons well understood it would not be either wise or fair to the different manufacturers to make a public statement at this time as to which of the steels has been developed so as to give the very best results.

It soon became apparent, while following this subject, that newer and better methods of chucking the work and of holding it to meet the strenuous conditions were necessary. The old time bent tail dog must give way to something very much more substantial. The old methods of obtaining diameters quickly and with certainty, which consisted in the lathe hand taking a light cut, trying his calipers, then another, and another, and another, until the desired diameter is obtained, must be dispensed with; and ready means for getting correct diameters, feeds, &c., by an unskilled workman must be adopted. To a great extent, the old time universal lathe, that was good for all jobs, must give way to the lathe made for its own particular work in manufacturing establishments. I do not mean by this that the regular ordinary type of lathe must be abandoned; it will always be a necessity; but possibly one-half of the lathes installed in the future will be designed more especially for a given class of work, with all the facilities for rapidly machining the work with the least possible consumption of both labor and power.

I have no doubt it will be a matter of great surprise to some of our members to hear that I have seen, within two weeks, a lathe running 29 hours at 270 feet per minute, reducing bars of steel 3¼ inches in diameter to 3 inches, sufficiently true, at one cut, to be delivered to the grinding machine, and without regrinding the tool one single time during the entire period. This created a difference in the time of machining this piece of from one hour, under the old system, down to 2½ minutes with the new, and produced a better piece of work. This seems incredible and yet is perfectly easy to prove to any one sufficiently interested to take the trouble to investigate. I have seen a tool stand up a solid hour on cast iron running at 125 feet per minute and removing scale. It must not be imagined, however, that such results as these are obtainable from machines of the regular design. Not only must the machine be made to suit the new conditions, but the methods of holding and driving the work and the methods of holding and grinding the tools must be changed.

Disadvantage to the Tool Builder.

Under these new conditions the machine tool maker is very often put at a great disadvantage. When the prospective purchaser becomes acquainted with some of the facts mentioned above he is immediately willing to place an order, provided the results are guaranteed, but is generally dissatisfied with the results he obtains when he

* Prepared for the sixth annual convention of the National Metal Trades Association.

gets the same machine in his own shop. The desired results may be shown to him in the works of the tool builder, but finding when he gets the machine in use that the results do not follow in his own shop he is too much inclined to lay the whole blame on the shoulders of the tool builder, who, in any event, makes only one profit when he sells the machine, while the man buying the machine could make an enormous profit each day, provided his shop was properly arranged and equipped to obtain the full efficiency of the tool.

I have a case in mind where a certain machine was delivered over a thousand miles from the shops of the manufacturer to a customer who, having failed signally in making use of the machine, refused to pay for it, requiring the manufacturer to send some one this distance and virtually revolutionize the conditions in the shop. He then refused to reimburse the manufacturer on the ground that the machines were sold to do this work and that it was the business of the maker of the machines to actually demonstrate their qualities to him in his own establishment. If this spirit is displayed very extensively it is going to stop the progress that is obtainable by the sheer fact that the man who gets the advantage is not willing to shoulder his part of the burden of creating proper conditions in his shop.

It must be borne in mind, when dealing with this subject, that a little difference in the hardness of the material upon which these high speed steels are engaged makes a great difference in the number of feet per minute at which they may be run. Ordinary mild steel can be turned all day long at 180 feet per minute with ¼-inch feed and ⅛-inch reduction; in fact, I have seen this done on steel of 0.20 carbon (or, at least, the steel was sold for 0.20 carbon, but we made no analysis of it to prove that this was exactly correct). Again we recently saw some cast iron rolls which had formerly had never less than two, and frequently three cuts, turned from the rough casting at one cut at 150 feet per minute with ⅛-inch feed, ½-inch reduction and the work was nice enough to go to the grinding machine.

In the matter of deep drilling of lathe spindles of 0.50 carbon that formerly took five hours (and many of them are taking this amount of time to-day), we are now finishing the pieces in 30 minutes. The former speed of 40 revolutions per minute was changed when boring a 1 9-16-inch hole to 400 revolutions per minute, and the feed from 3-1000 per revolution to 6-1000 per revolution.

We also find quite a little opposition in installing high speed machines from the men who run them. In referring to one shop only as an illustration I might say: The man had expended from 7 until 8:30 in the morning without starting his machine, and when approached by the foreman to know why the machine was not running, he said he had to take some time to clean up, and the foreman, inquiring if 15 minutes was not sufficient to wipe off the machine, was answered, "I am tired and have to rest." This lost him his place. The second man lost his place because he consumed more time in putting the work in and out than in the actual doing of it. These are matters, however, that will be adjusted in the hands of efficient managers.

It must be remembered that much more space around each machine is required, both for the stock in the rough and for the finished stock. I have found this from our own experience and point it out so that some one else may not meet with the same difficulty, and thus save a rearrangement of the machine, with all that it involves in the matter of adjusting pulleys on the line shaft, countershafts, shifters, &c.

What I have said is barely a synopsis of what may be said on the subject, but I trust is sufficient to set all of you to thinking, and I want to assure you that there is no intention on my part to secure any personal advantage, but merely to direct the attention of the members of the Metal Trades Association, or at least those who are not aware of it, to what is going on, because it is better to be in advance than to have other nations force us, through their superior knowledge of this subject, to follow them.

The period is not far distant when we shall find the markets of the world a necessity, as the rapid growth of our industry in our own country has already brought our production to a point where it is likely to be greater than the consumption. In order to compete for the markets of the world, especially in view of the labor conditions we have to contend with, it behooves all of us to be on the alert and to see to it that no stone is left unturned that will assist us in our endeavors to become the foremost industrial nation, and to make our product so well known the world over that the mere statement that an article is made in America will be sufficient for the buyer to take it for granted that it is as represented in every particular, and that the mere offering of it should mean its sale.

The Production of Iron Ore in 1902.

In the last six years the iron ore output of the United States has doubled in quantity. John Birkinbine, who has been collecting iron ore statistics for the United States Geological Survey since 1889, when the first systematic effort in that direction was made, calls attention to the fact that, in spite of fluctuations in the iron and steel industry, there has been a general advance in the production of iron ore, the output of 1897 being less than 50 per cent. of that of 1902. His report on the production of iron ores in 1902 is soon to be published as part of the annual volume of *Mineral Resources*.

The quantity of iron ore produced in the United States in 1902 amounted to 35,554,135 gross tons, valued at $65,412,950, an increase of 23 per cent. over the production of 1901, and of 103 per cent. over that of 1897. The iron ore produced in the year 1902 was obtained from mining operations carried on in 23 States and two Territories. Minnesota, with 15,137,650 tons to her credit, heads the list. Michigan, with 11,135,215 tons, stands second. Alabama, with a tonnage of 3,574,474, is the only other State that passes the million ton mark.

Red hematite is by far the most important class of iron ore produced in this country. Minnesota's entire output consisted of red hematite. Out of the 35,554,135 tons produced all over the country in 1902, 30,532,149 tons were red hematite. In addition to the iron ore mined 65,246 tons of zinc residuum were used as iron ore in 1902.

As Minnesota was the largest producer in 1902, it is natural to find that the Mesaba range, the chief contributor to its iron fame, far outranked the other iron ranges of the Lake Superior region in point of production. The Mesaba produced 13,080,118 tons, whereas the Menominee range, which ranked second, produced only 4,421,250 tons.

No other country can equal the United States in its astounding record of large producers. Whether or not this is a distinction to be coveted is a question for the student of social conditions rather than the statistician. The latter's figures show that 10,272,780 tons of iron ore came from eight mines, and 16,248,280 tons from 18 mines, the shipping operations of all of which, with two exceptions, are limited by climatic conditions to about 200 days annually. Only 126 operators produced 88 per cent. of the product for the country. Of those, 72 operators produced over 100,000 tons each. This concentration of the iron ore resources of the country in the hands of a few persons is the most significant thing in the report.

The hydraulic works which furnish the power to run the Chapin mine of the United States Steel Corporation, at Iron Mountain, Mich., were put in operation March 17. Two of the large compressors were also started on that day, and since that time the other compressors have been set to work. This is said to be one of the largest air compressing plants in the world, containing two duplex compressors with cylinders 32 x 60 inches, one duplex compressor with cylinders 34 x 60 inches and one duplex compressor with cylinders 36 x 60 inches. It is the intention later on to install an electric generating plant and transmit power to the other mines owned by this corporation on the Menominee range. The capacity of each of the two generators that will probably be installed will be 1500 kw.

Petroleum Developments During 1902.

The most active centers of development in the oil industry during 1902, according to F. H. Oliphant's report on the production of petroleum, published by the United States Geological Survey as part of its annual volume of *Mineral Resources*, were West Virginia, Kentucky, Kansas, Indian Territory, Louisiana and California.

A new and productive territory of considerable extent has been developed in Kansas. Although no wells of the gusher class have been found, a large percentage of profitable wells have been drilled, which produce from 10 to 35 barrels a day. These wells are comparatively shallow, ranging from 750 to 850 feet in depth, and the drilling is inexpensive, as it is usually accomplished by what is known as a portable rig. The field is in the southeastern portion of the State, in the counties of Neosho, Allen, Chautauqua, Montgomery and Wilson. The production for 1902 was 331,749 barrels, a gain of 85 per cent. over the output of the previous year. The production in all of the new pools suffered during 1902 for want of transportation. This condition was improved about the beginning of 1903 by the construction of a pipe line connecting the Chanute and Humboldt pools with the refinery at Neodesha.

Operations in the northern part of the Indian Territory, adjoining Kansas, were active during 1902, although they were somewhat retarded by conditions imposed by the Government upon persons procuring leases from the Indians, who own the land in fee. The only pool operated was that belonging to the Osage Nation, the oil of which was transported by rail to Neodesha, Kan., and there refined.

The year 1902 gave Louisiana a distinctive place among the petroleum producing States. The production and sales for the year amounted to 548,617 barrels. The most successful development was near Jennings, 90 miles east of Beaumont, Texas. A market has been obtained among the sugar refineries and other manufactories along the coast and the Mississippi River, which have in many instances discarded coal for fuel oil. From indications in many localities over a large portion of Southwestern Louisiana it is reasonable to predict that this State will in a few years be a large producer.

Novel Method of Excavating for Foundations.

Excavations of foundations for two or three large buildings in the downtown district of Chicago will be made in a novel way. Chicago's downtown streets, as now is generally known, are paralleled 46 feet below the surface with tunnels corresponding to the streets above. In order to get rid of the earth from the building foundations the Illinois Tunnel Company, owning the underground tunnels, will extend spurs from their main tunnels to a point about the center of the lots to be excavated, and wells will be dug connecting these spurs with the surface. Steel cars holding about 20,000 pounds capacity are being built, which will be run to a point at the bottom of the wells, and earth from the foundations will be shot down the well into these cars. An outlet for the earth thus sent below ground will be provided on the lake front, where the cars with their loads of dirt will be elevated up a well and run on tracks to the dump.

The first shipment of iron ore from the mine of the Illinois Iron Mining Company, at North Fredom, Wis., was made recently and regular shipments are now in progress. These shipments were first made from the stock pile, but the mine has been unwatered and ore is now going directly from the mine to the furnaces of the International Harvester Company at South Chicago. About 150 tons per day are being forwarded, but it is expected that this will shortly be increased to 250 or 300 tons per day.

The Pennsylvania Company are in the market for 2150 cars.

Warner Cut Meter.

In the machine shop the choice of proper cutting speed has practically been reduced to a science, for by experiments and tests it is now known at about what speed certain metals should be cut with tools of certain grades of steel to secure the maximum efficiency of cutting, of course taking into account the thickness and depth of the cut. It is one thing to have the theory fairly well worked out, but it is another to put it into practice, for it takes

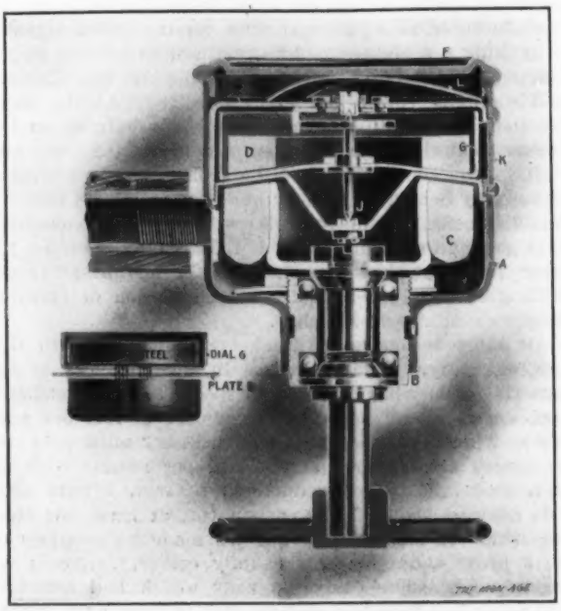


Fig. 1.—Section of the Cut Meter, Showing Construction.

time to figure out the speed at which a machine may be working and it is certainly not within the power of the ordinary machinist to estimate the speed by his eye with any degree of accuracy. The instrument which is illustrated herewith has been devised as a handy accessory about a machine tool, by using which the operator may determine in a moment just what cutting speed he is using. In principle it is a tachometer, but calibrated to record the travel in feet per minute of the circumference of the contact wheel rather than revolutions per minute.

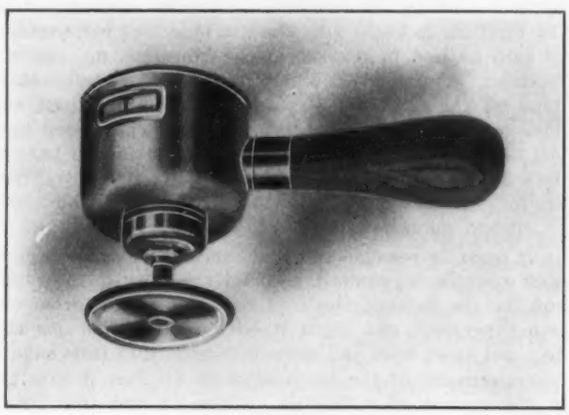


Fig. 2.—Exterior View.

So much of the problem was easily disposed of. The greater difficulty came in securing a machine of compact form that would work in any position, would not be liable to derangement by ordinary handling, and, most essential of all, would be accurate. The inventor of this instrument, Arthur P. Warner of Beloit, Wis., has made a complete departure from ordinary forms of tachometer in that it depends upon magnetism for its actuation rather than centrifugal force. The usual forms make use of a weight or weights which when revolving at high speed

tend to fly outward, but are opposed by a spring, the amount of expansion of the spring being measured by the displacement of a needle, and the amount of this displacement being shown on a dial calibrated to read in terms of the quantity which it is desired to measure. In other instruments a liquid is used which is raised in a glass tube by the action of a centrifugal pump on the spindle of the tachometer, the hight of the column of liquid being proportional to the speed of the pump, so that the tube may be calibrated to the desired scale. It is claimed for the tachometer, based on the magnetic

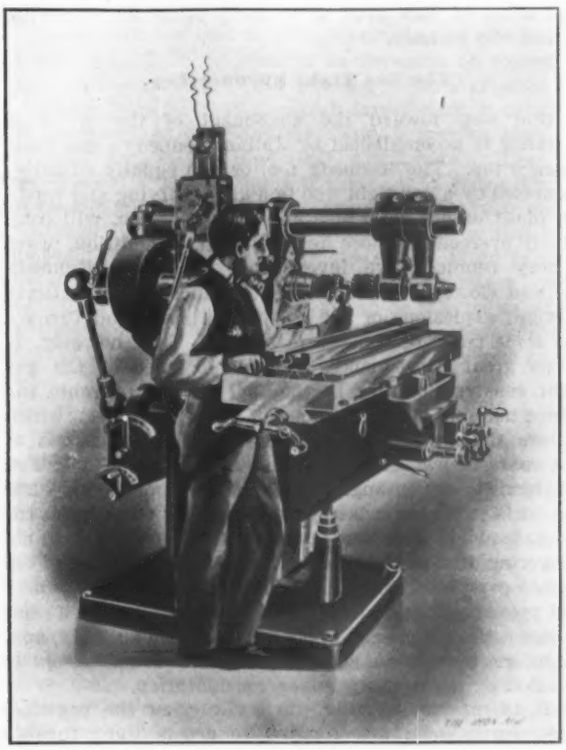


Fig. 3.—Measuring Cutting Speed of a Milling Machine.

action, that the reduced number of working parts eliminates the liability to error and wear and makes possible a smaller and more compact instrument.

The general exterior appearance of the Warner cut meter is shown in Fig. 1. It measures 5½ inches long from the outside of the case to the end of the handle and 3½ inches from the end of the spindle to the cover plate on the opposite end of the case. The construction is shown in Fig. 2, C being a magnet which is supported on the spindle of the instrument in ball bearings. The magnet is in the form of a ring, its ends, the north and south poles, being separated by about 1-32 inch, or about ½ of 1 per cent. of the length of the magnet. This narrow air gap effectively prevents the instrument from being influenced by outside magnetic forces, so that they may not affect its accuracy. On the opposite end of the spindle is attached the driving wheel L, which is a disk of proper diameter having a groove in its periphery in which is snapped a small solid rubber tire. Cups for the bearings are turned in the sleeve B, which is threaded and screws into the outer case A. The ball bearing is secured by a spring washer and adjusted by means of a special shaped wrench. In front of the magnet is a soft steel ring, D, which deflects the lines of force from the magnet through the aluminum disk G. This disk is mounted on a hardened steel shaft and is supported by sapphire jewels, J. The outside of the cylindrical face of the aluminum disk is graduated to read from zero up to 150 feet per minute. Attached to this shaft is a hair spring, H, adjusted so that it resists the turning of the aluminum dial and brings it back to zero when the magnet is at rest. The jewel bearings and the steel ring are carried in the inner case E, and the whole is telescoped into the outer case. The inner case also serves the purpose of protecting the dial G from air currents set up by the magnet when revolving. Through both outer and inner case an opening is made covered by a glass, K, through which the figures on the dial can be read.

The lines of force flow from the north pole of the magnet through the aluminum dial G to the steel ring and back again through the dial to the south pole of the magnet. When the magnet is revolved it establishes a force tending to rotate the dial G, and this force being in proportion to the speed of the magnet revolves the dial until the reaction of the hair spring equals the rotative force. The dial scale is laid off in equal divisions from the lowest to the highest reading. Since moving the magnet closer on the steel ring increases the torque or dragging effort, it is only necessary to select a hair spring of proper stiffness; then, revolving the magnet at a known speed, the ball bearing may be adjusted until the scale indicates the correct speed. The instrument will then be accurate over the entire range of the scale and will remain so permanently without the necessity for subsequent recalibration, unless it suffers some injury.

There is no mechanical connection between the magnet and the index dial, and as the magnet runs very easily, there is always an abundance of power to drive it, so that there is no source of inaccuracy in this part of the instrument, and the delicate mounting of the indicating dial practically eliminates all friction or retardation in that feature. The sensitiveness of the instrument can be judged from the statement that a change in speed of one-fifth of 1 per cent. is shown on the dial.

The illustrations of the method of using the instrument are shown in Figs. 3 and 4, the first being its use in determining the cutting speed of a rotary cutter on a milling machine and the second for determining the speed of cutting on a planer by placing the wheel in contact with the planer bed. It may seem difficult to understand how the reading can be accurate where the object tested has a rough surface, such as a milling cutter or a twist drill. The fact that it is possible is due to the momentum of the rotating parts and the ease with which they run; consequently, between the intermittent impulses received from a rough surface, the instrument does not have time

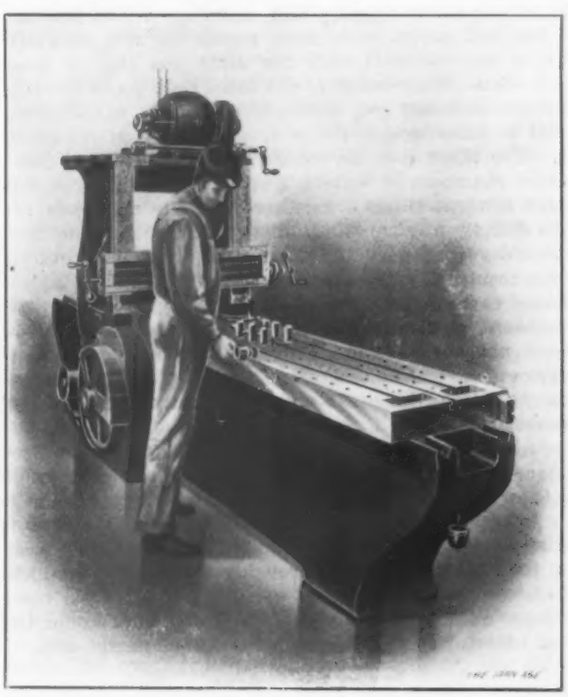


Fig. 4.—Measuring the Speed of a Planer Bed.

to slacken its speed and will accurately record the linear velocity of the cutting edges.

The cut meter is also available for a number of other uses besides determining the cutting speeds of machine tools. For instance, when held on the outside of a paper mill dryer it instantly indicates the exact rate at which the machine is making paper, and for determining the speeds of elevators it may be used without the necessity

of making any calculations and will give the maximum speed more accurately than could otherwise be obtained. The instrument is made by the Warner Instrument Company, Beloit, Wis., and is sold in the East by S. A. Bean, 39 Cortlandt street, New York City.

Explosions, Slips and the Ore Dust Evil.

BY E. A. UEHLING.

The decision of the Supreme Court of Pennsylvania, that the Jones & Laughlin Steel Company must prevent the ore dust evil, is bound to be far reaching in its effect, and in the end will prove as beneficial to the operators of large blast furnaces in or near large cities as to the property owners to whom the conditions became intolerable. To the writer, who has given the subject of blast furnace economies much thought and study, it seems most strange that it should require the mandate of the courts to abate an evil, the prevention of which would produce economies that would yield a large interest on the necessary capital outlay.

Purifying Furnace Gas.

There is no improvement that can be made at a blast furnace plant, whether modern or of more or less obsolete type, that would be productive of more economical results than the equipment of an apparatus for thoroughly purifying the gas. That this most important phase of blast furnace equipment should have received so little consideration or have been entirely overlooked or neglected in modern furnace construction becomes doubly remarkable when a thorough consideration of the subject would have brought out the fact that the incorporation of gas purifying apparatus would not have materially increased, but possibly would even have decreased, the total cost of the plant.

If clean gas were available, the heating surface of every stove could be easily doubled, hence three stoves of two-thirds the size of those now in use would be of equal heating capacity and be of greater efficiency than the present four-stove equipment. Similarly 25 to 30 per cent. of the boiler capacity now necessary would produce the required steam with more regularity and certainty than is now possible with the dirty gas that is used under them. This would at the same time make directly available sufficient gas, which, if utilized in gas engines, would at least double the power now derived from the gas. The labor cost for cleaning stoves, flues and combustion chambers of boilers, &c., and the stoppages and delays incident thereto, together with the numerous repairs directly attributable to dirty gas, would be entirely done away with. All the damage to the brick work in stoves results from the fluxing action caused by the impurities carried in by the gas. If clean gas were available there is no reason why the brick work in stoves should not last almost indefinitely. The sand blasting action on the valves and valve seats, &c., which has become an item of importance since the introduction of the Mesaba ores, as well as the cutting out of the brick lining in hot blast mains and tuyere stocks, would be entirely done away with. All these little items of repair count up to a considerable total annually, which represents a fair interest on no inconsiderable fraction of the capital outlay necessary to put in the plant to prevent such wear and tear. With the gas thoroughly washed the products of combustion issuing from the draft stacks of a blast furnace would be practically invisible and become the least harmful of any produced by the industrial arts.

Gas Explosions.

It is, of course, evident that the purification of the blast furnace gases can have no direct influence on the hanging and slipping of the stock in the furnace or the explosion of the gas before reaching the washery. The writer from observations made in 20 years of practical furnacing has come to the conclusion that by far the larger number of gas explosions are due to explosion doors. Gas cannot explode without the proper admixture of air, and there is nothing better calculated to permit air to enter and mix with the gas in the flue than a number of leaky explosion doors; and there is no apparatus so difficult to keep tight. It may be said, however, that, except when a furnace is just being blown in, explosions in the gas main are rarely disastrous. The most disastrous gas explosions are caused from the gas which finds its way from the hearth of the furnace through the tuyere stocks and hot blast connections to the air receiver and even to the blowing engines, not infrequently wrecking the latter. The writer has never personally experienced an explosion of this kind, and although he has seen the wrecks caused by several of them, he has never been able to account for, or get a satisfactory explanation of, how the gas got there and what caused it to ignite. The most certain method to prevent explosions of this kind is to keep some blast moving toward the furnace.

The Gas Tight Furnace Top.

One step toward the abatement of the ore dust nuisance is accomplished by Julian Kennedy's gas tight furnace top. The Kennedy top, or one equally effective, connected by a gas tight flue to a gas purifying and washing plant of adequate size and proper design, will completely overcome the ore dust evil and, in addition, prove a very remunerative investment. That the Kennedy top and closed gas mains should reduce, if not entirely prevent, explosions of the gas in the main and furnace top is at least reasonable to expect. This, however, is of no great consequence. The importance of the gas tight construction lies in the fact that it prevents the escape not only of vast volumes of gas and ore dust, which pollute the atmosphere, but also of large quantities of the coarser ore, limestone, and especially coke, which are thrown out through the explosion doors every time the furnace makes a heavy slip, covering the ground for a hundred or more feet around about the furnace, endangering life and damaging property. The closed top cannot prevent the hanging and slipping, though it may and probably does reduce the violence of the action; but it does cause all the gas to pass through the washery, and, therefore, becomes a necessary element in the complete solution of the problem under consideration.

It is safe to say that the majority of the practical blast furnacemen are opposed to a gas tight furnace top and the doing away with all explosion doors. This opposition is dictated by the same inherent conservatism that opposed the adoption of the bell and hopper in place of the open tunnel head 40 years ago. All such opposition is natural, but quite unfounded. In the first place, there is no reason why such a top cannot be made of any required strength, and then, again, the pressures to be resisted are even in extreme cases comparatively moderate. However, since the proof of the pudding is in the eating of it, and a considerable number of furnaces have been equipped with these tops and all have stood the test of such slips and Mesaba ore explosions (?) as have naturally occurred, all fear may be abandoned. When the Mesaba ores were first introduced numerous so-called Mesaba ore explosions occurred, which in several cases were very disastrous, blowing the tops clean off the furnaces and resulting in loss of life. The force was supposed to be of a real explosive nature, similar to that of gunpowder.

The top plates and hopper, which up to this time were rarely fastened down, but simply rested on the brick wall of the lining or on brackets, were now more and more securely fastened down and explosion doors were provided, and although the quantity of Mesaba ore in the mixture has since been doubled and trebled, little has recently been heard of furnace tops having been blown off.

While there can be no doubt that the explosion doors near the top of the furnace have accomplished the end in view—viz., to prevent the lifting and dislocating of the top rigging of the blast furnace—their introduction has very greatly increased the dust evil.

The first step, therefore, to cure the dust nuisance must be to do away with top explosion doors.

That the major part of the ore dust trouble is attributal to the use of the Mesaba ores is certain. That the evil would entirely cease if the Mesaba ores were left off is not likely.

Fast Driving and Excessive Furnace Hights.

Two factors have gone hand in hand to aggravate the ore dust evil to a point where it has become intolerable in or near large cities at least. First, hard driving, and, second, excessive furnace hights, and these two have made necessary the high blast pressures now common. Just so sure as hard driving is bound to persist, excessive furnace hights are bound to be reduced, except where coarse and refractory ores predominate in the mixture; and before the end of the present decade we shall see the majority of the high furnaces in which Mesaba ores form the major part of the burden cut down to 80 feet and below.

There is no ore that is both physically and chemically so illy adapted to be smelted in furnaces of excessive hight as the Mesaba. If a working column of stock in a furnace from 50 to 60 feet high is sufficient to produce the necessary or desirable reactions, a greater hight is not only useless, but positively detrimental. That 60 feet of hight of stock column is sufficient is demonstrated by all the smaller furnaces, many of which turn out a greater product per unit of capacity on a lower fuel consumption than the very high furnaces. It is an erroneous idea that fast driving necessarily requires great hight of furnace. The kind of ore to be smelted must be as thoroughly considered in determining the most efficient hight of a blast furnace as the strength of the coke available.

Furnace Lines.

The relation between bosh diameter and hight is much less fixed than that between bosh area and hearth area; the effective hearth area more than any other measurement determines the capacity of the furnace. The leaning of blast furnacemen is at present strongly toward an increased batter in the upper lining of the furnace, and it appears reasonable that this should reduce the tendency to hang and hence to slip. If it does, the higher the furnace the more it will be handicapped, since the batter than can be given necessarily varies inversely to the hight above the bosh, other dimensions remaining the same. In the writer's experience, very much batter in the lines above the bosh is not conducive to the best fuel economy, and a narrow stock line tends to increase the quantity of flue dust carried over by the gas current. There is much more to be expected from the proper method of filling and stock distribution than in any practicable changes in the furnace lines above the bosh.*

Blast furnaces of all sizes and shapes have hung and slipped. They have behaved well and badly with all lines, between the straight cylindrical and the double truncated cone and their innumerable combinations, better with some, worse with others; with lines of considerable batter probably less than with such of cylindrical shape; very much more with a high, steep bosh than with a low, flat one. Whether large or small, high or low, they have all hung and slipped. They have hung and slipped more with very slow and very fast driving than when driven at a moderate rate. They have a greater tendency to hang and slip with fine ores than with coarse, and while the tendency to hang up is greatest with inferior, soft and dirty fuel and fine ores, yet occasional hanging and slipping will occur even with superior fuel and the choicest ores. Blast furnaces have hung and slipped before the Mesaba ores were discovered, and it is more than probable that some hanging and slipping will still occur after these ores have ceased to be an important factor in the production of iron.

The problem before us to-day, however, is due to the fact that not only the frequency and severity of the hanging and slipping in all the furnaces using Mesaba ores largely in their mixtures are incomparably greater, but that the accompanying phenomena are of such a nature that they have become intolerable to the community living within their sphere of influence.

That the decision of the court will not only be upheld, but will be applied to all the blast furnaces within its jurisdiction and serve as a precedent for enjoining others which affect the neighboring property in a like prejudicial manner, is more than probable. If it were problematical or even exceedingly difficult to overcome the evil which forms the basis of the injunction, the question would be a serious one. Since, however, the abatement of the nuisance is not only quite within the limits of possible accomplishment, but if done by proper means will result in important benefits to the plant, the decision of the court will really prove a blessing in disguise.

* See Mr. Barrow's paper on "The Use of High Percentages of Mesaba Ores in Coke Blast Furnace Practice," and the writer's discussion of same. (Am. Inst. of Mining Engineers.)

The Production of Manganese Ore in 1902.

According to a report made for the United States Geological Survey by John Birkinbine the quantity of manganese ore produced in the United States in the year 1902 was 16,477 gross tons, valued at $177,911. This is an increase of 4482 tons over the 1901 production of 11,995 tons, and is the largest amount mined since the year 1891.

Six States contributed to the production. They were Arkansas, California, Georgia, Montana, South Carolina and Virginia, and the greatest of these was Montana, which produced 9000 tons, valued at $117,000. This is the more notable since it was Montana's first year of production. Alabama, Missouri, Tennessee and Utah, which supplied ore in 1901, reported no manganese ores mined in 1902. South Carolina's contribution was merely a sample shipment of 8 tons. The other prominent contributing States, with the exception of California, report a reduction in the amount of ore produced. Had it not been for Montana the production would have shown a considerable decline in 1902.

These figures do not take into account the manganiferous iron ores produced in the United States. Those came from three widely separated districts—Colorado, the Lake Superior region and Virginia—and represented a total value of $2,001,626. In quantity they amounted to 901,214 tons, with an average value of $2.22 a ton.

The production of manganiferous silver ores in the United States during 1902 amounted to 194,132 tons, valued at $908,098. Most of these came from Colorado, and Leadville particularly.

Many zinc ores are obtained in Northern New Jersey which carry varying percentages of iron and manganese. The clinker resulting from the treatment of the ores to obtain the zinc content is used in the production of spiegeleisen. The amount of this kind of ore produced in the year 1902 was 65,246 tons.

Owing to the insufficient supply of satisfactory native ores large quantities of manganese are imported from various foreign countries. The quantity imported during the year 1902 amounted to 235,576 gross tons, valued at $1,931,282, or $8.20 per ton. Brazil was the principal contributor, retaining the first place, taken from Russia in 1901. The other important contributors were India, Cuba, Turkey and Spain, in the order named, and smaller amounts were imported from Russia, Japan, Germany and Panama.

The manganese ore mined in the United States, and also that imported from foreign countries, is chiefly used in the production either of spiegeleisen or of ferromanganese.

The officials of the Pittsburgh Valve, Foundry & Construction Company, at Pittsburg, whose large machine shop in that city was destroyed by fire last week, have decided to rebuild at once, and contracts for the building and equipment will be placed this week. Arrangements have been made by which the company will be able to complete unfinished orders without serious delay.

The Semet-Solvay by-product ovens of the Milwaukee Coke & Gas Company, Milwaukee, Wis., were last week put in operation for the first time and are now producing a coke which the company state to be highly satisfactory both as to structure and chemical analysis. Forty ovens are now in use and a second 40 will be completed shortly.

The Langen Two-Speed Countershaft.

The practice of using one speed for all kinds of milling for either roughing or finishing is fast disappearing on planers as well as other machine tools. The accompanying illustration shows a new planer countershaft which will give two cutting speeds without altering the return speed of the table. Fig. 1 shows a sectional view of the countershaft and the belt shipper. A is the large fly wheel pulley which returns the table and is keyed fast to the countershaft G, the latter being stopped and started by the tight and loose pulleys I and J. The pulley B is used for the cutting stroke and is keyed to the bushing E, which revolves loosely on the countershaft. On this same bushing are mounted tight and loose pulleys, C and D, and into the end of it is fitted the clutch mechanism L, which is used for engaging and disengaging it with the shaft.

With the work clamped ready in position if it is desired to rough it at, say, 50 feet per minute, the belt is moved from the loose pulley J onto the tight pulley I by means of the shipper handle R. This starts up the countershaft and with it the return pulley A, the loose bushing E, with the pulleys mounted on it, meanwhile standing idle. By next moving the shipper lever S the lever H causes the clutch mechanism L to engage the loose sleeve, securing it tightly to the shaft and consequently running it at the same speed, which for illustration may be taken as 500 revolutions per minute and corresponding to a cutting speed of 50 feet per minute. After the piece is roughed all over a slow speed of about 20 feet per minute, which will allow the tool to retain its edge, may be used for the finishing cut. To make this change the shifter lever S is moved in the opposite direction when it first disengages the clutch, and then moving further transfers the belt from the loose pulley C to the tight pulley D. This pulley being tight on the loose sleeve causes it to rotate at 200 revolutions per minute, reducing the speed of the table to 20 feet per minute. The change from fast to slow speed is made very quickly, as it requires simply one movement of the shifter lever S. These speeds which have been selected were taken merely as representative. They may, of course, vary according to the class of work which is handled most. In some cases there may be occasion to plane hard steel, when a slower speed than 20 feet a minute would be wanted; but this same speed could be utilized when finishing cast iron, as the finishing may be accomplished by a good operator with the aid of the constant high speed return of the table with so little extra consumption of time that 1 or 2 feet less per minute in the speed of the table would not be noticed.

The clutch mechanism for securing the bushing E to the countershaft is simple and compact. The short hub L, Fig. 2, is keyed and set screwed to the shaft, and over it is fitted the ring K, which is secured to it by means of two pins. A section of the ring is cut out, allowing but one-half of the pin holes to remain, so that the ring can be removed without disturbing the pins. In the hub L is fitted a stud which has a flat surface milled on one side. Revolving the stud by means of a lever causes it to expand the ring by engaging one end where the section is cut out. The lever is secured to the stud on the outside of the hub. The loose sleeve is enlarged on the end E and counterbored to receive the ring K. It will be appreciated that it takes but a very slight movement of the lever to expand the ring sufficiently to clamp it very tight. This clutch never carries the full power transmitted from the countershaft to the machine, neither is it subjected to the shocks caused by the reverse of the planer at the end of the cutting stroke, but is only required to carry the power necessary for the cutting stroke.

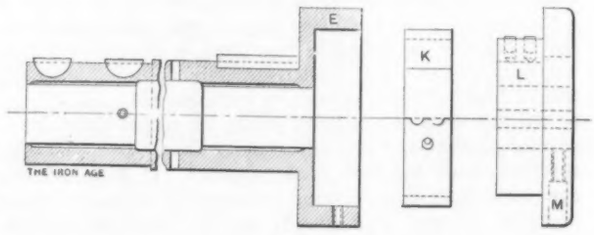


Fig. 2.—Details of Clutch Mechanism.

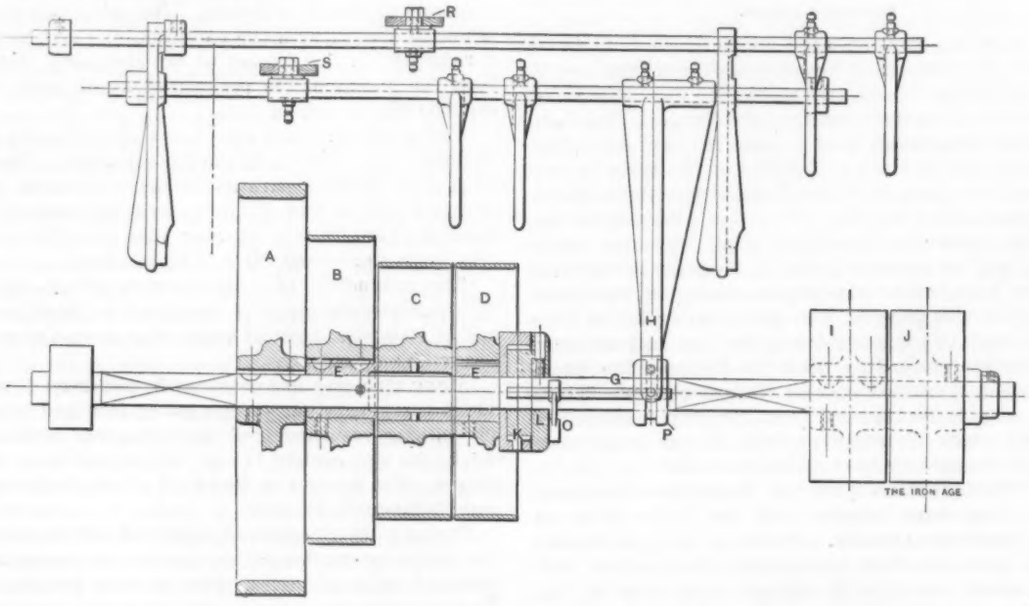


Fig. 1.—Elevation of Pulleys and Belt Shippers, with Clutch Mechanism in Section.

THE LANGEN TWO-SPEED COUNTERSHAFT.

It will be noticed that the loose pulley C is 1 inch wider than the tight pulley D. This requires the belt to travel another inch after leaving the tight pulley before it engages the clutch mechanism F; so that when it is desired to have the sleeve stand still the belt may be off the tight pulley and the clutch mechanism disengaged at the same time. The countershaft has been running under a test for the last six months, during which time it has been subjected to severe overloads and rough usage, so as to develop any weak points, but it is claimed to have shown itself fully capable to perform its work. It is manufactured by the Cincinnati Planer Company, Cincinnati, Ohio, and is the invention of George Langen, superintendent of the company.

Some Scotch Superheaters.

Superheated steam generated by adding heat to saturated steam is a bad conductor of heat, and has a greater volume per unit of weight than saturated steam. The higher the presure is the smaller the increase of volume. The question raised by R. Leutze at the Engineering Congress at Glasgow was whether the increase of volume does not require more additional heat than the benefit derived therefrom is worth. How many B. T. U. less are required to produce 1 cubic foot of superheated steam than the same amount of saturated steam? To produce, he says, 1 cubic foot of steam at 115 pounds pressure and a temperature of 570 degrees F. $\frac{350\text{-}297}{350} = 15$ per cent. less heat is required. Consequently, superheating results in gain. Superheated steam does not condense during the admission period if sufficiently superheated. The use of superheated steam has always effected great economy, and only a few degrees of superheat are sufficient to decrease the steam and coal consumption considerably. To obtain the maximum economy 660 to 700 degrees is required, and the engines have to be specially designed to withstand this temperature. The introduction of superheated steam into engines largely influences the expansion of the heated parts. Engines always gave trouble when the distribution of metal in the cylinders was not uniform, as parts with more metal expanded most and forced the cylinder walls toward the inside and forced the cylinder out of shape. When liners were used in the cylinders the liners were squeezed in at the ends, decreased the diameter and jammed the piston body, if sufficient clearance was not provided. With steam jackets heated with steam of 500 degrees F. the lubrication ceased as the cylinder walls became overheated; consequently it was found necessary to do away with the jackets, or if jackets were already provided, not to pass the steam through them. Pistons constructed on the Ramsbottom principle always worked satisfactorily, except in the case of pistons fitted with steel springs, when they were in contact with highly superheated steam. Any kind of gun metal gets brittle after a very short time; therefore valves, seats, and all parts in direct contact with superheated steam must be made of cast iron or other suitable mixture. Copper also loses about 40 per cent. of its strength at that temperature, consequently copper bends in pipes are not practicable.

High Boiler Pressure Not Required.

An engine suitably constructed is as safe with superheated steam as any other engine is with saturated steam. The use of superheated steam need not be restricted to single acting engines. Other important advantages than economy are connected with the utilization of superheated steam. It makes the steam consumption independent of the size of the engine, and it does not require high boiler pressures, 160 pounds being the highest to be really recommended, as no advantage is to be derived by exceeding that. With regard to the economy from engines working with superheated steam, a single cylinder condensing engine with superheated steam works more economically than a compound condensing engine with saturated steam, and 13½ pounds of steam per I. H. P. per hour has been reached with a 120 horse-power horizontal single cylinder Corliss engine at 125 pounds boiler pressure.

It is said that the design of Sir William Congreve, in 1821, was the earliest attempt to superheat steam after its formation in a boiler, his object having been "to increase its volume." It is not likely that the importance of increasing its temperature was recognized at so early a date. Trevethick experimented in 1828 on engines in which the steam pipes and cylinders were enclosed in brick flues with a fire grate attached in order to prevent condensation, and with which a saving of 33.4 per cent. of the coal burned was effected. Early forms of superheaters with marine boilers used in this country were placed above the boiler at the base of the funnel. One of the earliest was that introduced by John Penn & Son in the P. & O. Company's steamer "Valetta." Two horizontal faggots of wrought iron tubes, 2 inches diameter inside and 6 feet 3 inches long, formed the superheater, each bundle consisting of 44 tubes. The tubes were fixed into three flat chambers made of wrought iron, welded up at the corners, one chamber being common to the two groups of tubes. The steam from the boiler entered the center chamber through a stop valve and was taken off from the end chambers. R. Napier & Sons, Glasgow, introduced in the steamer "Oleg" superheaters consisting of horizontal steam tubes placed in an oblong casing forming the root of the funnel. The tubes were 2 inches outside diameter, 5 feet 6 inches long, and were fastened in flat stayed boxes or headers. In Beardmore's superheater horizontal steam tubes with flat headers were used, but this arrangement differed from the others in that it formed an integral portion of the boiler. Parson & Pilgrim's superheaters differed from other forms, being placed in the furnaces of the boilers. A steam pipe common to two furnaces descended from the steam space and branched into horizontal pipes, each of which passed along to near the back of the grate. Two saddle-shaped pipes then rose from the horizontal pipe into the combustion space, and the steam passed through them, returning in an outgoing horizontal pipe. The arched pipes were frequently made red hot, and steam at 264 degrees F. attained a temperature of from 484 to 540 degrees F., the pressure remaining unchanged.

Factors Governing Rates of Economy.

The saving in steam due to superheating varies considerably with the different types of engines—simple, compound or triple. It increases with the increase in ratio of expansion in each cylinder, and it is dependent on a variety of other conditions, such as the size of engine, type of valve used, and the degree of perfection of the covering of the cylinders and pipes. The percentage saving is greatest in single cylinder engines working with an early cut-off. In the case of rolling-mill engines there is the great advantage that the engines respond much more readily than when they have to free themselves of water, and that the time occupied in rolling out plates, &c., is reduced to nearly one-half.

With a given percentage saving in steam the percentage saving in coal depends on the type and the efficiency of the superheater. With Professor Watkinson's shunt circuit type of superheater the saving in coal is about 2 per cent. less than the percentage saving in steam. With Watkinson's up-take type of superheater, as fitted to marine and water tube boilers, the percentage saving in coal is always greater than the percentage saving in steam. This is also the case when the superheater is heated by the waste gases from steel heating and other furnace.

With independently fired superheaters the percentage saving in coal is about 5 per cent. less than the percentage saving in steam, but in all large plants the independently fired superheater has many advantages over every other type.

Mechan & Sons, Limited, Scotstoun Iron Works, Glasgow, certify that Professor Watkinson's superheater has reduced their coal bill by 30 per cent. This great saving is not a saving effected in a test of a few hours' duration only, but it is the saving as shown by their books for a full year's working. This superheater has enabled them to work with two boilers instead of three. It does not involve any special supervision, and it has not cost a single penny for repairs. Such a great saving cannot be claimed in all cases, but wherever this superheater has been applied a saving in fuel ranging from 12 per cent. to over 30 per cent. has been effected.

Principal Causes of Saving.

The principal saving effected by superheating the steam is due to the reduction of the initial condensation within the engine cylinders, but a considerable portion of the saving is also due to the fact that much less steam leaks past the valves and pistons when the steam is superheated than when it is wet. With superheated steam the rate of leakage past valves and pistons is reduced to between one-thirtieth and one-fiftieth of what it is when the steam is wet. The leakage past valves and pistons is much greater in most engines than is generally realized, especially in old engines and in the cheaper types of engines. As superheating does not increase the pressure of the steam, a superheater may be applied to existing boilers and engines without entailing any other changes.

The Watkinson Superheater.

Watkinson's independently fired superheater is constructed entirely of mild steel; none of its parts is of cast iron. The tubes are solid drawn; all the joints and headers are away from the furnace gases; perfect provision is made for free expansion of the tubes; all the tubes can be completely drained, and the superheat is always under perfect control. It is simple in construction, and, owing to its high efficiency, it occupies a minimum space

The headers are of wrought iron or mild steel. The tubes, of solid drawn steel, are arranged in rows at very small distances apart, so that the products of combustion in passing between the tubes are divided into thin sheets, and in this way they are compelled to give up their heat

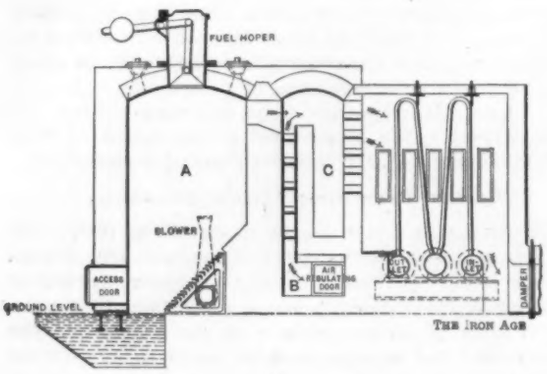


Fig. 1.—The Gas Producer Type.

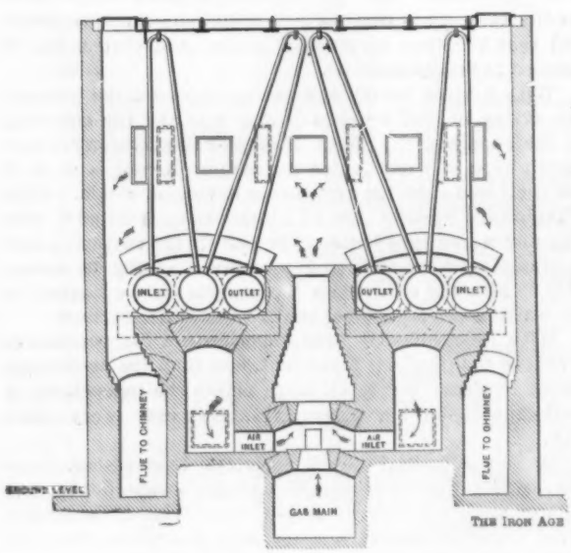


Fig. 3.—Gas Fired Superheater.

THE WATKINSON SUPERHEATER.

much more readily to the tubes. The products of combustion flow transversely to the tubes, and the efficiency of the arrangement is illustrated by the fact that, although the gases are white hot as they approach the first wall of tubes, they pass away from the superheater at a temperature of about 460 degrees F.

The gases in these superheaters are cooled through the same range of temperature, although the total length of path over the tube surface is only 6 inches. The high rate of heat absorption, obtained as described above, enables the size, weight and cost of the superheater to be greatly reduced as compared with any other arrangement. The close spacing between the tubes is rendered possible by the tube ends being drawn down to a smaller diameter for expansion into the headers. The same object may be accomplished by suitably bending the tubes near their ends, so as to allow of the tube holes in the headers being zigzagged. The tubes are expanded into the headers from the ends by means of bevel-wheel driven expanders. Any tube can be put in or taken out without interfering with any other tube. As the tubes are nearly vertical, soot and ashes do not accumulate on them, and all the tubes can be perfectly drained.

The cost of construction may be reduced by dispensing with the middle header and making the tubes of the inverted W form instead of the inverted U form. With the inverted W form of the tube, however, complete drainage of the tubes is impossible, and blowing through with steam does not appreciably help matters.

This superheater is erected at a colliery in Lanarkshire, where nine boilers were required to supply the steam for the various engines, but where only six are now required with the superheater. The fact that it pays to adopt superheating even at a colliery, where the cost of coal is a minimum, indicates that the saving in other cases, and especially on board ship, will give a very

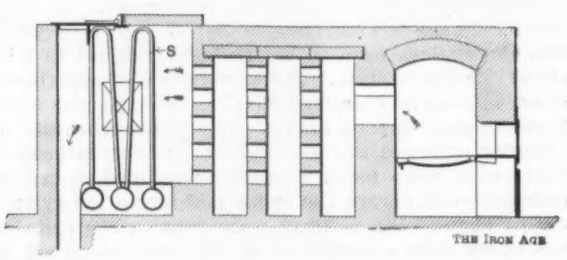


Fig. 2.—Independently Fired Superheater.

handsome return for the money invested in superheating appliances.

A Watkinson superheater of the gas producer type (Fig. 1) has been at work in one place night and day for about three years, and a recent examination of it showed that the tubes were apparently as perfect as when new. In this case six boilers were in use before the adoption of the superheater, whereas now only four are required.

Gas Producer Type of Furnace Preferred.

Whenever possible Professor Watkinson prefers the gas producer type of furnace in conjunction with independently fired superheaters, because with this arrangement the attention required is less than with an ordinary furnace, the fuel being fed in through the hopper, say, once an hour, and the ashes being removed at the bottom of the producer every 12 hours. Another advantage is that smoke is entirely got rid of, but the greatest advantage is due to the perfect control which is thus obtained of the degree to which the steam is superheated. In the gas producer the air for primary combustion is blown in through a special grate near the bottom of the producer. The air for secondary combustion enters and passes up through ducts provided between the gas producer and the combustion chamber. The products of combustion flow from the combustion chamber to the superheater through a perforated wall. The degree to which the steam is superheated can be almost instantaneously regulated by varying the rate of supply of steam to the blower. By means of a very simple attachment the rate of supply of steam to the blower can be controlled automatically, so as to maintain constant the temperature to which steam is superheated.

Two Watkinson superheaters were built by Mechan & Sons for a large steel works at Motherweel, near Glasgow. These two superheaters are capable of dealing with 260,000 pounds of steam per hour, and are gas fired in accordance with the patentee's system (Fig. 3). It is believed that these superheaters are the most powerful ever constructed.

An independently fired superheater may be combined with an ordinary furnace (Fig. 2). When an ordinary furnace is used in conjunction with a superheater the furnace must be very frequently attended to or great fluctuations in the temperature to which the steam is

superheated will occur, due to variations in the condition of the fire. The superheater may also act as a condenser whenever the furnace door is opened. To overcome these difficulties the patentee provides a heat reservoir, in the form of perforated brick walls, which arrangement gives very satisfactory results, though not so easily controlled as the gas producer type, and it requires more attention.

An intermediate type is also produced. In this case ordinary fire bars are used, but a magazine is provided, into which the fuel is fed at the top, and from which it automatically slides down to the fire grate. A water trough is provided in the ashpit.

For marine, locomotive and some other purposes, where space is limited, the tubes are made of the inverted U form, and they are expanded into an annular tube plate that is bolted to the header, which is either a steel casting or a forging. A light steel casing surrounds the superheater, and the products of combustion flow across the tubes. This superheater is also arranged for the use of oil fuel, and it can be fired with any kind of fuel burned in an ordinary furnace or in a gas producer. If an economizer of the air heater type is used the efficiency of the plant is appreciably increased. The outside diameter of the casing for a superheater of this type for 150,000 pounds of steam per hour is about 11 feet.

Location of Superheater.

When superheaters are heated by products of combustion from boiler furnaces the superheater should be in such a position that it will be acted upon by products of combustion at a temperature of 1000 degrees F. or higher. Thus superheaters are sometimes put into the downtake chamber at the rear end of the boiler, but when this is done the tubes of the superheater inevitably become red hot during steam raising, unless they are filled with water during this time.

With the object of obviating difficulties, and in order that the degree to which the steam is superheated may be instantaneously regulated, the Watkinson shunt circuit system of supplying hot products of combustion to the superheater was devised. During steam raising, and whenever the engines are standing, a damper is closed and the products of combustion all flow downward to the bottom flue. When the damper is open some of the products of combustion flow through the superheater chamber, and by adjusting the position of the damper the degree to which the steam is superheated can be instantly regulated. The damper, being in a comparatively cool position, does not burn away. This system works exceedingly well, and the saving in coal effected by it averages about 20 per cent. This principle is applied to a boiler of the "dryback" multitubular type to an ordinary Lancashire boiler, and to an ordinary single-ended marine boiler. This arrangement may be modified so that the products of combustion, after leaving the superheater, flow directly to the boiler uptake. This shunt circuit system may also be applied to water tube and locomotive boilers.

Prof. W. H. Watkinson, who has introduced the types above described, which are now in large use in Scotland, is professor of steam engineering at the Glasgow and West of Scotland Technical College, Glasgow. B. T.

The Manufacture of Siloxicon.—The future of siloxicon, the product of the Siloxicon Company of Niagara Falls, N. Y., appears assured. Ever since the material was discovered by E. G. Acheson important tests have been made, with the result that capital is being enlisted in several enterprises that will have to do with the material. The Siloxicon Brick Company have been incorporated under the laws of Delaware. The capital interested is mainly from Philadelphia, but the company's office will be in New York City. This company will control the use of siloxicon and its application to the refractory field. In Buffalo a company is being organized to control the application of siloxicon to the manufacture of crucibles, retorts, linings, &c. Parties are negotiating for siloxicon rights in the British possessions, Italy, Belgium and Southern France, experiments having inspired confidence in the material in each case.

Rocky Mountain Iron and Coal Notes.

SALT LAKE CITY, Utah, March 28, 1904.—Statements that have from time to time appeared in the daily press as to the early erection of an iron and steel making plant near Ogden, this State, are without foundation. On their face they appeared improbable, and the best assurance is given that there is no such move in actual contemplation.

The Colorado Fuel & Iron Company are about to abandon, or largely decrease, their mining operations in South Central New Mexico, at Fierro. Their ore is running into pyrite. This ore has been hauled south via Deming and Rincon and up through La Junta, on the Atchison, Topeka & Santa Fé Railroad, a long distance, to Pueblo. The Colorado Company are now sinking two shafts on their Sunrise mines, in Wyoming, and will be mining heavily from underground very soon. These mines were opened several years ago as steam shovel propositions, and have been so conducted since.

At their new explorations in Southwest Utah the Colorado Fuel & Iron Company are now, and have been for a year, since about the time these ore fields were described in *The Iron Age*, working a large force of men. This force now numbers more than 100 men, and results have been most satisfactory. S. B. Milner of Salt Lake and associates are also working crews on Desert Mound and elsewhere, and their results are most favorable. There is little question that these ore fields will become an important source of supply both for Pueblo and the West in due time. Construction on the W. A. Clark road toward San Pedro Harbor, Cal., has progressed rapidly, and the line is now far beyond the junction point for these ore mines.

Colonel Milner has not yet completed the preliminary details for the steel works in which he and associates propose to utilize these South Utah ores. Experiments with coking coals from their lands in the mountains along the Denver & Rio Grande Railroad have been continued from time to time. Recently coke made in Pennsylvania from these coals gave the following results: For coal, volatile, organic matter, 47 per cent.; fixed carbon, 49.72 per cent.; ash, 3.28 per cent.; sulphur, 0.6 per cent.; phosphorus, trace. For coke, volatile, organic matter, 3.12 per cent.; fixed carbon, 90.5 per cent.; ash, 6.38 per cent.; sulphur, 0.51 per cent.; phosphorus, trace. This coal was from Bear Creek Canyon, and the coke was made at Latrobe.

Extensive discoveries of coal have just been made in Southeast Arizona, not far from Clifton, and are being examined by engineers in the employ of Phelps, Dodge & Co. Their measures seem similar to those of Southern Colorado. The enormous extent and thickness of these latter coal fields are not appreciated, but they are said by those who know most about them to be of immense value. D. E. W.

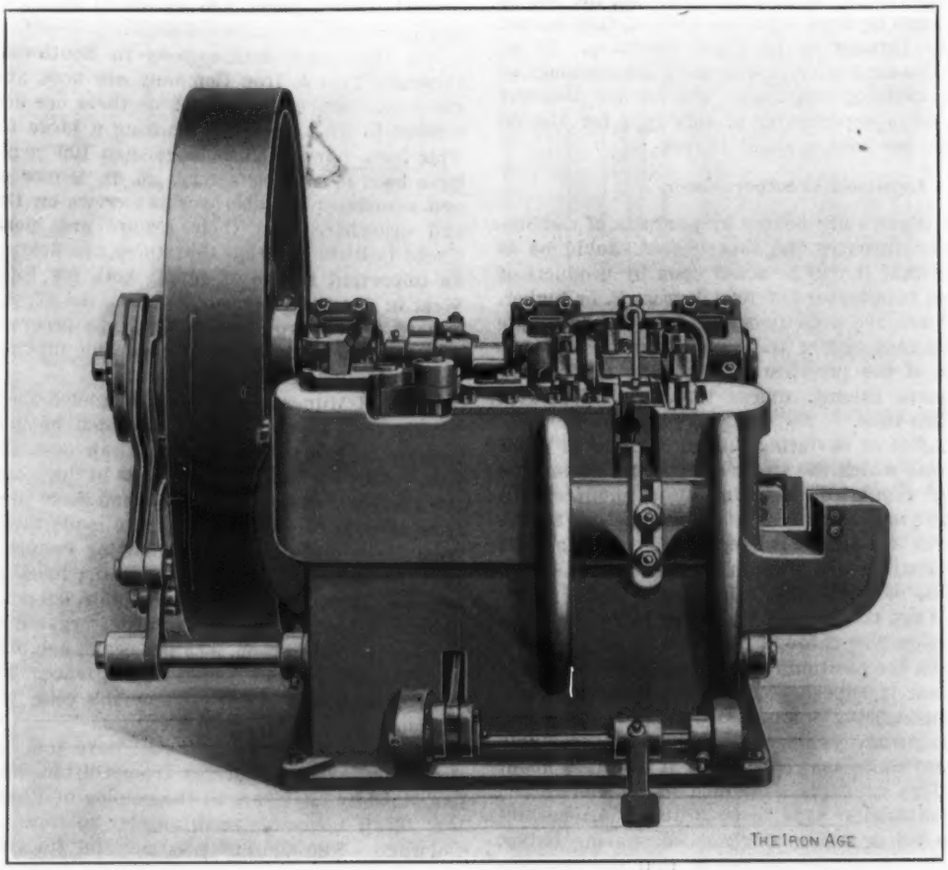
Duty on Small Tin Disks.—The Board of United States General Appraisers at New York, on April 2, promulgated an opinion written by General Appraiser Fischer, overruling a protest by John Reeve of Newport, Vt., against the assessment of 1½ cents a pound on small tin disks, which are a waste product in the manufacture of tin cans, being the parts stamped out when making the holes through which the cans are to be filled. They were classified as manufactures of tin plate. The importer claimed entry for them at 10 per cent. as waste, or at 45 per cent. as manufactures of metal, and pointed out that the tax of 1½ cents a pound on them was inequitable, in that it was greater than the duty on the cans themselves.

The following is an estimate of the production of the various mines of the International Harvester Company for 1904: Illinois mine, 150,000 tons; Hawkins mine, 200,000 tons; Agnew mine, 150,000 tons; Lot 3 at Crystal Falls, 50,000 tons; total, 550,000 tons. Calling the Illinois Old Range Bessemer, this makes the total of the various grades as follows: Old Range Bessemer, 150,000 tons, Mesaba range Bessemer, 350,000 tons; Old Range non-Bessemer, 50,000 tons.

A New Heading and Forging Machine.

An improved line of heading and forging machines possessing many points of merit is now being built by the National Machinery Company, Tiffin, Ohio. These machines are designed for heading bolts and rivets and for making innumerable upsets and special forgings. The advantages of machines of this type are well recognized by railroad, car and bridge companies, and in fact all concerns making duplicate forgings for upsets. The one shown in the illustration is capable of heading bolts or rivets up to 2 inches in diameter. The machine is also made in sizes for handling work up to 4 inches in diameter.

The machine has a steel bed and is provided with removable plates under all reciprocating parts, avoiding wear upon the bed. The main shaft is a steel forging



A NEW HEADING AND FORGING MACHINE.

and runs in well lubricated bearings, which are inclined toward the front of the machine at an angle of 45 degrees, bringing the heading thrust against solid metal. The crank on the main shaft operates the heading slide, connection being made by a pitman, and the heading tool is clamped in a slot in the end of the slide. Chilled cams on the main shaft, through the medium of toggles and a toggle slide, actuate the movable gripping die slide, and as the cams work against adjustable chilled rolls, wear and friction are reduced to a minimum.

In the various bearings phosphor bronze is used to a large extent, on account of its excellent qualities as a bearing metal. The rolls are bushed with it, and revolve on large hammered steel pins. The toggle block and one of the toggles are steel castings bushed with phosphor bronze, and the other toggle is a phosphor bronze casting. To avoid the cramping action of the ordinary toggle movements these toggles are made in the bell crank form, and the adjusting to regulate the pressure of the gripping dies is accomplished by means of a wedge and screw at the back of the toggle block.

In designing these machines due appreciation has been shown for the fact that if the toggles move while under strain their life is greatly decreased, and also that if the pressure of the gripping dies is not uniform it is impossible to head the bolts or rivets without fins under the heads. An advantage of the cam operated grip is that the toggles do not oscillate past centers, but remain stationary while the work is gripped in the dies, with the result that wear is reduced to a minimum, and the length of the life of the toggles extended. Furthermore, as the toggles move just to the center line, but do not pass it, they afford a positive grip on the work during the full travel of the heading slide and allow the grip to be opened by a very small amount of power. To prevent damaging the machine in the event of a piece of cold work being accidentally caught between the gripping dies, the latter are provided with a breaker relief. This device does not decrease the afficiency of the grip, as no springs are used in its construction, and consequently a constant pressure is maintained on the gripping dies until the breaker operates. The machines are built either to run continuously for making bolts or rivets with a single blow or are provided with pin clutches and automatic brakes, so that one or more revolutions for single heading may be made at the will of the operator.

The Production of Mica in 1902.

The variations in use, production and importation of mica are set forth in a report on the production of that mineral in 1902 by Dr. Joseph A. Holmes for the United States Geological Survey.

The total quantity of mica produced in the United States in that year, as reported to the survey, was as follows: Plate mica, 373,266 pounds, valued at $83,843; scrap mica, 1028 tons, of 2000 pounds, valued at $13,081; and mica rough as mined, or unmanufactured, 372 tons, valued at $21,925, making a total value of $118,849.

The increase in the production of plate mica during the last three years is due to the increasing quantity of small sized mica disks and rectangular sheets that have been cut for electrical purposes. Some of the small, clear pieces obtained in cutting up the large sheets are now split very thin, rearranged and cemented closely together,

forming large sheets called micanite, which are then cut into the shapes and sizes desired. For some purposes these sheets of micanite answer as well as the natural sheets and have the advantage of being much cheaper. In recent years scrap mica has been manufactured into a covering for boiler tubes and steam pipes, to take the place of the more expensive asbestos coverings. Waste mica not available for other purposes is used in the manufacture of wall papers and lubricants. During 1902 there was, however, a large falling off in the production of scrap mica, which in 1902 amounted to 1150 tons of 2000 pounds, valued at $14,606, as against 2171 short tons, valued at $19,719 in 1901.

The tables which show the great increase in the importation of mica during 1902 are significant. This increase, valued at $131,278, is larger than the total value of the product of mica in the United States during 1902. It illustrates the increasing demand for mica in this country, but also suggests the interesting fact that mica can be mined in India and landed in this country at a lower price than it can be mined in some places in the United States. Canada is also a large contributor to our mica supply.

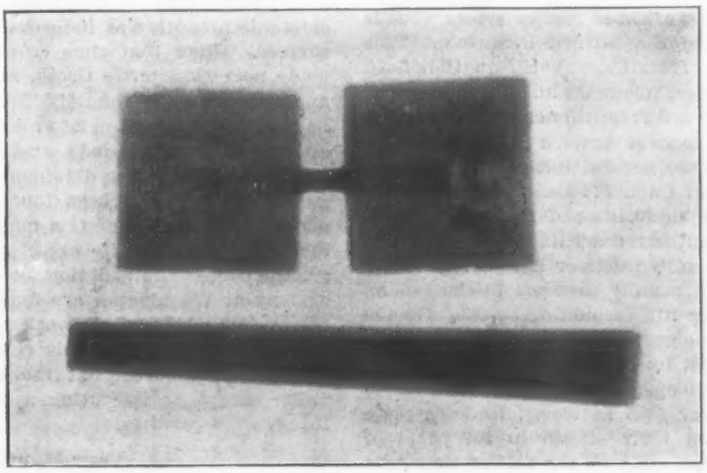
Although mica is widely distributed in the United States, actual mining has been limited, during the last few years, to North Carolina, New Hampshire, South Dakota, New Mexico, Idaho, Virginia and Colorado. Some development work has also been carried on in California, Nevada, Maine, Alabama and Georgia. In several of these States good deposits of mica are known to exist that are not now available on account of their distance from railroads or other means of transportation.

A Farmers' Co-operative Manufacturing Project.

The Farmers' Co-operative Harvesting Machine & Implement Company are now being organized at Springfield, Ohio, with a capitalization of $5,000,000, the stock being divided into shares of $25 each. About $1,000,000 of this stock, in cash, factories, implements, rights, machinery, &c., has been secured at Springfield, leaving $4,000,000 to be subscribed by the farmers of the United States. This amount of stock may be increased, depending upon the subscriptions made by farmers. It is said that the company has the backing of the National Grange, and that this organization has pledged itself to take stock in the company to the extent of $1,500,000. This, it is stated, will be made a 10 per cent. dividend paying stock, and at the same time it is said that the farmer stockholder will be able to purchase machines at 10 per cent. less than the standard prices, because of the saving in canvassing expenses, which the farmer has heretofore had to bear in the purchase of agricultural implements. A full line of machines will be made by the new company, such as reapers, mowers, binders, grain drills, all kinds of haying and harvesting machinery, threshing machines, engines, &c., covering all the agricultural implements in general use in this country. The construction of factories will begin about June 1. Each class of machines will be built and housed in a building distinct from all others, the several departments being operated separately while under the same general management. The harvesting machine department will be the largest of the various divisions of the plant, consisting of ten buildings, each 1000 feet long and 60 feet in width, every alternate building having two stories. Brick will be utilized in the construction of all buildings, which will have slate roofs and be as nearly fire proof as possible. Up-to-date labor-saving machinery equipment will be installed and natural gas used for its operation. Switch tracks will be run between the buildings, and trolley tracks will be arranged throughout each structure to facilitate the easy and rapid movement of both raw and finished materials. W. N. Whitely is at the head of the project.

Radiographs of Cast Iron and Steel.

In a communication to the *Journal* of the Franklin Institute Alex. E. Outerbridge, Jr., of Philadelphia, furnishes an account of some interesting shadowgraphs, or radiographs, made for him by Williams, Brown & Earle by the aid of radium bromide of high activity, imported from Paris. They show that emanations from this wonderful element discovered by Professor and Madam Curie will penetrate cast iron readily. In the half-tone illustration two pieces of a cast iron test bar, already alluded to in this communication, were cut 1-16 inch thickness, one before and the other after expansion, by the Outerbridge method. These were laid upon a strip of lead (a metal which is almost impermeable to the emanations from radium) cut to a sort of dumbbell shape. A tube containing 100 mm. of radium of 10,000 activity (by the Curie scale), was placed centrally by measurement 4 inches above the pieces of cast iron. A wedge shaped piece of steel, of the same thickness, was placed close to the cast iron pieces, for comparison, steel being less permeable to these emanations than cast iron. After an exposure of 38 hours the negative, which was placed beneath those objects, was developed and the print made therefrom.



Radiograph Made with Radium of 10,000 Activity (Curie's Scale), Showing Remarkable Permeability of Cast Iron, Both Expanded and Untreated.

Several curious and interesting phenomena may be noticed—*e.g.*, the rays passed through both pieces of cast iron, and were intercepted by the lead strip making a distinct image of the lead strip underneath the cast iron. The central portion of the lead exposed to the rays between the two pieces of cast iron appears narrower than the portion seen through the cast iron, and looks more like a round rod than a flat strip. Also, penumbra show around the edges of the cast iron and steel, indicating that the rays are in some degree deflected around the edges. The fact that such dense metals as iron and steel are permeable to emanations from radium is very interesting, and may prove of practical value in detecting flaws. Mr. Outerbridge is informed that the X-rays will not penetrate these metals.

The Tin Deposits of Alaska.

United States Geological Survey Report on Recent Discoveries.

WASHINGTON, D. C., April 5, 1904.—An interesting advance bulletin presenting briefly the results of an investigation of the tin deposits of the York region of Alaska has just been completed for the United States Geological Survey by Arthur J. Collier, who made a comprehensive survey of the Seward Peninsula during the summer of 1903. Through the courtesy of the Director of the Survey and Prof. C. W. Hayes, geologist in charge, the correspondent of *The Iron Age* is enabled to present an abstract of this bulletin in advance of publication.

Tin has been reported from several localities in the United States, but has never proved to be present in commercial quantities. A few years ago, however, stream tin was discovered by a Survey party in Alaska. This discovery attracted much attention. During the field season of 1903 a discovery of lode tin was made in Alaska, which is the subject of this bulletin.

Location of Deposits.

The known occurrences of tin in Alaska are in what is called the York region of the Seward Peninsula. This region derives its name from Cape York, an ill-defined promontory on Bering Sea, about 90 miles northwest of Nome. It extends westward from this cape and includes Cape Prince of Wales, the most western point of the continent. The region has the general form of an isosceles triangle, with its apex at Cape Prince of Wales and its two sides formed by the shore lines of the Arctic Ocean and Bering Sea. The southern coast line is, in the main, inhospitable and unbroken by inlets or harbors. Back of narrow beaches the land usually presents to the sea an abrupt escarpment, giving it a forbidding aspect. On the north the land slopes more gently to the Arctic Ocean, and the coast is characterized by barrier beaches which cut off broad lagoons from the open sea.

After the discovery of gold at Nome, in 1899, prospectors rapidly extended their search to all parts of Seward Peninsula, and as early as the fall of that year placer gold had been found in Anikovik River. In 1900 Alfred H. Brooks of the United States Geological Survey visited the York region and found in the placers of Anikovik River and Buhner Creek, one of its tributaries, some specimens of stream tin. Early in 1901 an account of these discoveries was published by Mr. Brooks, and the general interest in the tin deposits of the York region dates from that publication. Since that time tin ore has been found both in lodes and in alluvial deposits at a number of widely separated localities.

In 1903 Mr. Collier, assisted by Frank L. Hess, was detailed to continue the investigation of the mineral resources of Seward Peninsula. In the course of the investigation the York region was again visited; hasty examinations were made of the three localities which give the most promise of the production of tin, and reports were obtained from many other localities which have been prospected to some extent. The three localities visited are known as Lost River, Buck Creek and Cape Mountain, the two extreme points being 25 miles apart.

The occurrence of tin bearing lodes in the bed rock has been verified by the Geological Survey at points known as Lost River and Cape Mountain. The occurrence of tin in placer deposits has been confirmed on Anikovik River, Buhner Creek, a tributary of the Anikovik, and on Buck Creek, a tributary of Grouse Creek, which flows through Mint River into the Lopp Lagoon. Tin ore has also been reported from a great many other localities which have not been thoroughly examined by geologists. The tin deposits, as far as known, do not follow any definite system, and are confined to no particular belt or zone. The ore, either in lodes or in placer deposits, has been found in association with all the sedimentary formations here present. The known occurrences of tin ore will be described under the headings "Lost River," "Cape Mountain," "Buck Creek." "Buhner Creek" and "Anikovik River."

Lost River.

Lode tin deposits have been found 4 or 5 miles from the coast on Lost River, which enters Bering Sea 10 miles west of Port Clarence. Lost River has a length of about 10 miles and drains the central part of the York Mountains. Its two tributaries, Tin Creek and Cassiterite Creek, enter from the east about 3 miles and 4 miles, respectively, from its mouth, and tin ore has been found on both of these creeks.

To summarize briefly the evidence in regard to this deposit, the tin ore is, in part at least, essentially an altered granite porphyry, or "greisen," having crystals of cassiterite disseminated through it. This greisen forms a dike, which has been followed eastward from Cassiterite Creek to Tin Creek, a distance of about 6000 feet, and has been examined at its eastern and western ends by United States geologists, who collected specimens of tin ore from it near Cassiterite Creek. At its eastern end, near Tin Creek, no specimens containing cassiterite were collected by members of the Geological Survey, but such specimens have been obtained by others.

When the dike was examined in the latter part of July, 1903, no excavations had been made on it, and it was therefore impossible to measure the exact width at any point owing to the talus covering it, though considerable breadth was indicated by the fragments on the surface. Since that time cross cut trenches have been made near Cassiterite Creek, and are reported to reveal a width of approximately 100 feet. The excavations have not gone far enough to allow of systematic sampling, and the value of the lode must therefore be left an open question until further developments are made.

Tin ore has also been found in place on Tin Creek, about ½ mile south of this main lode, at the upper contact of a large granite area. Specimens of mineralized granite were obtained that on examination in the laboratory at Washington are found to contain stannite, or tin pyrites, together with other metallic sulphides. The mineralized granite of this character apparently covers a considerable area, but the ore is probably of little value except as indicating a wider distribution of tin through the granites.

Cape Mountain.

The Cape Mountain tin deposits occur in a high peak which marks the most western point of America. A settlement called Tin City has grown up within the last year on the southeastern side, while on the northwest side, facing toward Bering Strait, the old Eskimo village of Kinnegan is located.

The ore obtained at Cape Mountain differs in general appearance from that seen on Lost River. Large pieces of nearly pure cassiterite, one of which weighed about 9 pounds, are said to have been found on the surface of the mountain. A specimen obtained by the writer weighs, approximately, 2 pounds, and is nearly pure cassiterite, showing little, if any, outward signs of crystallization, but has embedded in it and surrounded it much tourmaline in slender needles. While in this vicinity the writer was shown a number of large crystals of cassiterite, colorless and practically transparent. Much of the supposed tin ore contains a great many dark minerals that have been mistaken for cassiterite, but are simply tourmaline in slender black or brown needles.

Tin ore was discovered on Cape Mountain in July, 1902, and extensive developments were planned for the season of 1903. The plan of this work was as follows: A large dynamo driven by a gasoline engine was to be placed near the beach at the point now known as Tin City, and from this dynamo wires were to be run to several points on the mountain to supply power for electric drills. By the use of these drills it was expected that prospect tunnels could be rapidly extended into the heart of the mountain, in order to crosscut the ledges from which the float ore, above described, had been derived. After spending nearly the whole of the season of 1903 in getting the machinery in place, it was found that the engine for driving the dynamo was defective, and the plan for development work during the winter of 1903-1904 was necessarily suspended. At the present writing, so far as is known, no work is in progress on Cape Moun-

tain, and very little advance has been made in real knowledge of the nature of the ore deposits.

Buck Creek.

Buck Creek is the scene of the first attempt at tin mining on a practical scale in Alaska, and is the present center of tin placer mining activities. This settlement is on the Arctic slope of Seward Peninsula, about 20 miles northeast of York and 4 miles from tidewater on Lopp Lagoon, an inlet from the Arctic Ocean.

To briefly summarize the evidence regarding the Buck Creek region, tin ore has been found in the gravels of Buck Creek from its mouth to within a mile of its head. The pay streak is confined to the present stream bed and flood plain deposits, and probably varies from 10 or 12 feet to 150 feet in width. In the present creek bed the ore is found from the surface down. Outside the creek bed there is a covering of moss and muck above the gravels. No ore is known to have been found on the hillside surrounding Buck Creek or on the plateau surface in which Buck Creek is incised, though such an occurrence is to be expected. The thickness of tin bearing gravels varies from a few inches to 4 or 5 feet. Estimates of the amount of tin ore in the gravels vary from 8 to 27 pounds per cubic yard, but probably the former amount is more nearly the average of the creek.

Tin ore was discovered on Buck Creek in the fall of 1901, and some mining for stream tin was attempted in the summer of 1902. As a result of this work several tons of ore were shipped to the United States. During the summer of 1903 several companies were exploiting claims on the creek. The methods of mining and sluicing stream tin were all modifications of somewhat primitive methods of gold placer mining. It is reported that considerable ore was obtained and hauled to York for shipment. Should the tin prove to be in sufficient quantity on this creek or in any creeks in its vicinity more economical methods of mining must be adopted. In other parts of Seward Peninsula hydraulic mining has been practiced with marked success in the gold placers, and could probably be adapted to the tin placers as well. Water for this purpose can be obtained from the streams rising in the York Moutnains, and can probably be brought in mining ditches to the tin placers of Buck Creek and vicinity, though this will be somewhat expensive.

Anikovik River and Buhner Creek.

Anikovik River enters Bering Sea at the town of York, and has a length of about 15 miles. It flows in a comparatively broad valley cut in the York Plateau. In the lower part of the valley there are extensive gravel deposits. Buhner Creek is a small tributary of the Anikovik River from the west, about three miles from the coast. This creek has a length of about a mile and flows in a short V-shaped gulch cut in the slates. On this creek the stream tin was found concentrated on the bed rock with very heavy minerals. A sample of the concentrates from the sluice boxes yielded the following minerals: Cassiterite, magnetite, ilmenite, limonite, pyrite, fluorite, garnet and gold. The determination by per cent. of weight was as follows: 90 per cent. of tin stone, 5 per cent. magnetite, other minerals 5 per cent.

On Anikovik River specimens of cassiterite have been obtained from the sluice boxes. One pebble of stream tin obtained from this locality was about 2 inches in diameter. Since 1901 these workings have been obtained by miners, neither gold nor cassiterite having been found in paying quantities. On Anikovik River there are extensive gravel deposits, which it is possible might be made to yield fair returns either in gold or tin if economically worked on an extensive scale by hydraulic methods.

Reported Occurrences of Stream Tin.

Prospectors who are familiar with the stream tin from Buck Creek report finding small amounts of the ore in a great many streams in the York region; among these are the Baituk and Kigezruk creeks, flowing into Bering Sea; Banner Creek, a tributary of Anikovik River; several small creeks flowing into Lopp Lagoon; Cara Creek, a tributary of Mint River, and York Creek, a tributary of Pinguk River.

Stream tin has been reported from all parts of Seward Peninsula where gold mining is in progress, but, except in respect to the York region, these reports have generally been found to be without foundation.

Occurrences of Lode Ore.

Discoveries of tin bearing lodes have been reported by prospectors from many other localties in Seward Peninsula, some of which deserve notice, since geologic conditions are known to be promising. These are the localities in which intrusive stocks of granite occur, but in no case has the presence of tin ore in appreciable amounts been confirmed by the Geological Survey, and they can be passed over with mere mention. These localities are Brooks Mountain, near the head of Lost River and 4 miles north of the Lost River tin deposits; the hills east of Don River; Ears Mountain, about 50 miles north of Port Clarence; Hot Springs, about 70 miles northeast of Port Clarence; Asses Ears, about 20 miles south of Kotzebue Sound, and the Diomede Islands, in Bering Strait, about 30 miles west of Cape Prince of Wales.

Conclusions.

The above facts show cassiterite to be rather irregularly distributed through an area of about 450 square miles, embracing the western end of Seward Peninsula. At three localities—Anikovik River, Buhner Creek and Buck Creek—its occurrence in placers has been verified by the Geological Survey, and lode tin has been found by the Survey at Lost River and at Cape Mountain. There are a number of other places where prospectors report its occurrence in lode or placer form. The tin ore is almost all cassiterite, though a little stannite has been found at one locality. Its original source is in deposits of at least two essentially different type. In the one it is in quartz veins, which cut phyllites or metamorphic slates; in the other the cassiterite is disseminated through more or less altered granitic rocks. This second type of lode deposit is the one which gives promise of commercial importance.

In estimating the value of tin ores in this northern region several facts should be borne in mind. The region is utterly without timber, and is accessible by ocean steamers only from June to the end of October at the longest. Harbor facilities are poor, and all supplies and wages are high. On the other hand, the construction of railroads and wagon roads is not difficult, and will require comparatively small outlay. All of the occurrences described are within a few miles of tidewater. Freight rates to Puget Sound ports should be very low, as the large fleet of ocean steamers which runs to Nome returns empty. Last summer upward of 98,000 tons of freight were brought to Alaska by vessels that called at Nome. It is fair to say that these tin deposits are well worth careful and systematic prospecting. W. L. C.

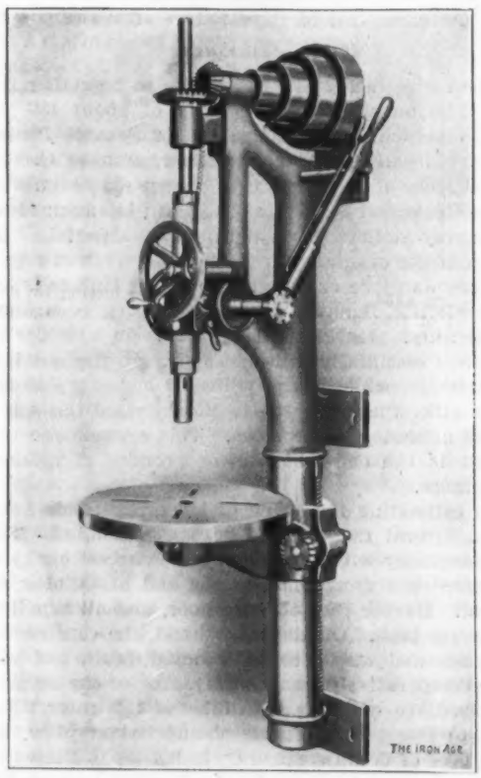
Last month No. 1 furnace of the Carnegie Steel Company, at South Sharon, Pa., turned out 16,365 tons of pig iron. An attempt was made to have this furnace break the best month's record of any of the Duquesne furnaces of the Carnegie Steel Company at Duquesne, but owing to the fact that the stack was idle two days on account of high water the attempt was not successful, one of the Duquesne furnaces having made in a single month over 19,000 tons of iron. The attempt will again be made this month.

The annual contracts for coal for plants of the affiliated interests of the United States Steel Corporation that are best served by mines of the Pittsburgh Coal Company, because of lower freight rates, were placed last week, prices being slightly lower than last year. The Pittsburgh Coal Company make their contracts for coal operative after the settlement of the mine wage rate each year, and the old contract with the United States Steel Corporation does not expire until about April 15.

The Standard Steel Car Company, Pittsburgh, have received an order from the Pennsylvania Railroad Company for 1125 steel cars. The American Car & Foundry Company have an order from the same source for 1000 steel cars.

A Power Post Drill.

The drill shown in the accompanying illustration is designed to be bolted to a post or wall, after the manner of a hand power post drill, where it will have greater rigidity than that of a drill of equal capacity supported from the floor. It has a new mechanical feature in the device for throwing in the screw feed. The worm spindle is supported on a bracket pivoted on the drill head, and the small lever shown just at the rear of the spindle actuates a cam that throws the bracket so as to cause the worm to mesh with the worm wheel. When the cam is released the weight of the hand wheel disengages the worm. The handle for the lever feed is provided with a latch, which may be thrown out of action when the screw feed is being used by depressing the spoon handle. The latch device is useful also when using the quick return



THE BOYNTON & PLUMMER POWER POST DRILL.

feed, which is operated by means of a wheel on the worm wheel shaft at the opposite end from the lever. In using the lever to bring the drill down to the work quickly the latch is held in action by means of a spring. To drill work resting on the floor the table may be swung to one side. The drill is driven by a four-cone pulley. The entire length of the machine is 72 inches; the greatest distance between table and spindle is 24 inches, and the distance from the center of the spindle to the column is 12 inches. It is manufactured by Boynton & Plummer of Worcester, Mass.

The Pittsburgh Foundrymen's Association.—The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in Engineer's Hall, 410 Penn avenue, Pittsburgh, on Monday evening, April 4. Through the courtesy of C. W. Friend, vice-president of the Clinton Iron & Steel Company, a number of the members visited Clinton Furnace, on West Carson street, Pittsburgh. This stack has recently been remodeled and repaired, and is now turning out about 200 tons of iron per day.

John W. Cole, dealer in machinery at Providence, R. I., is to open a store for the conduct of the business at 76 Fountain street, in that city. Mr. Cole has had an office in the Industrial Trust Company Building.

The National Boiler Regulations.

Commission Bill Sidetracked in Favor of Department Measure.

WASHINGTON, D. C., April 5. 1904.—An attempt is being made by the Department of Commerce and Labor to put through Congress, at the present session if possible, a bill for the comprehensive revision of the laws relating to steamboat inspection, and especially those statutes providing the requirements for the construction and inspection of marine boilers. A degree of celerity in striking contrast to the speed of this movement in recent months is now being employed, and within the space of three days the Department's bill has been introduced in both houses and favorably reported by the Senate Committee on Commerce, a fact that will doubtless prove decidedly interesting to the members of the American Boiler Manufacturers' Association, whose bill authorizing the appointment of a commission to revise the laws has been sidetracked in favor of the Department's measure without even the formality of a hearing.

The Commission Plan.

Readers of *The Iron Age* are familiar with the efforts made by the American Boiler Manufacturers' Association in recent years to secure authority from Congress for the appointment of a commission to thoroughly revise and codify the laws relating to the construction and inspection of boilers. A bill having this object in view was introduced in the last Congress, with the indorsement of the Secretary of the Treasury, who then had jurisdiction over the matter, and with the approval of Supervising Inspector General Dumont. The bill was passed by the Senate, but was not acted upon by the House committee, for the reason, as stated by Chairman Grosvenor, that it was believed the Secretary of the Treasury had full authority to appoint a commission without special legislation, quite overlooking the fact that there was no appropriation to cover the unavoidable expenses of the proposed investigation.

Congress having thus failed to act in the matter, the Board of Supervising Inspectors was convened in Washington a year ago and directed by the Secretary of the Treasury to revise the regulations in accordance with the best modern practice as comprehensively as possible under the existing statutes, and to make such recommendations for the amendment of the laws themselves as seemed advisable. A special committee of boiler manufacturers appeared before the board and sought to secure the cooperation of its members in urging the commission plan upon the attention of the Department of Commerce and Labor, to which the Steamboat Inspection Service was transferred on July 1. The board, however, gave the manufacturers very little encouragement, and after sessions lasting over two months adjourned, placing certain recommendations in the hands of the Supervising Inspector General, which were subsequently transmitted to the Secretary of Commerce and Labor. These recommendations have not heretofore been published, but the American Boiler Manufacturers' Association have understood that before any further action was taken they would be given a hearing by the Department at which the special committee having this matter in charge had expected to present arguments in favor of the commission bill.

Secretary Cortelyou's Bill.

Several weeks ago Messrs. Meier and Fletcher of the special committee came to Washington and caused to be introduced in Congress the original commission bill with slight modifications. They were given a hearing by the House Committee on the Merchant Marine and Fisheries and were gratified at the reception accorded the measure. This bill was referred to the Department of Commerce and Labor, and on March 28 Secretary Cortelyou transmitted to Senator Frye and Representative Grosvenor the text of a bill drawn by Deputy Commissioner Smith of the Bureau of Corporations, with the following accompanying note:

I beg to transmit herewith the draft of a bill to amend certain sections of Title LII of the Revised Statutes, "Regulation

of Steam Vessels," and acts amendatory thereto, and for other purposes, and to request that, if the measure commends itself to your judgment, you be good enough to introduce it in the Senate. There is great need for the revision of certain laws relating to the inspection of steam vessels. The proposed amendments embodied in the bill have been very carefully considered by the Board of Supervising Inspectors of Steam Vessels, and much attention has been given to a revision of the propositions made; and the proposed bill embodies so much of said propositions as are deemed to be desirable and practicable. A number of other changes were proposed, but they involve wide differences of opinion, and it is believed they should be dealt with separately, if at all.

The bill as forwarded by the Department amends Section 4405, 4414, 4415, 4417, 4418, 4423, 4433, 4449, 4470, 4483, 4491 and 4498 Revised Statutes. In the main the changes proposed in the law will probably be approved by the boiler manufacturers of the country, chiefly for the reason that they follow the general recommendation made by the special committee of the American Association that the law should be so amended as to eliminate all detailed requirements or specifications with regard to boiler construction, for the purpose of enabling changes to be made from time to time by the Board of Supervising Inspectors to bring the requirements up to the best modern practice. The law at present is conceded to be so antiquated that it is impossible to apply it strictly to the best types of marine boilers. It was pointed out that even should the statutes be carefully revised by the present Congress, the progress in boiler construction might soon render them inadequate, making it necessary to apply to Congress nearly every year in order to keep the requirements up to date. These facts have been kept carefully in view by the Department, and the pending bill provides for the elimination from the statutes of all details of construction, leaving them to be determined by regulation from time to time.

Terms of the Bill.

Section 1 of the Department's bill changes the system of amending the regulations so as to render them more elastic. At present the regulations can be made only by concurrent action of the Secretary and Board of Supervising Inspectors. This board assembles only once a year, and as the members come from all over the United States, they cannot easily assemble oftener. The result is that the regulations are now practically as inelastic as statute law. The proposed change gives the Secretary control over these regulations, while retaining the duty of the board to meet and to make recommendations. Inasmuch as these regulations deal largely with mechanical appliances, a considerable degree of elasticity is needed in them to adjust them to the improvements that are being constantly made. Another change strikes out of the statute the provision which relieves the Supervising Inspector for the Pacific Coast from attendance at the board meeting in Washington and requires him to be present.

Section 2 changes the system upon which the salaries of the local inspectors are based. The present system provides that each inspector shall be paid according to the number of vessels he inspects. The result has been that inspectors have in some cases given their chief attention to the mere matter of getting vessels to submit to inspection, regardless of whether such inspection was properly made or whether their other duties were properly attended to. The proposed change groups the inspection districts in six classes, according to the salary received during the last fiscal year, and provides that hereafter inspectors shall receive a fixed salary dependent upon the district in which they work.

Section 3 specifies the qualifications of inspectors and the manner of their appointment so as to bring the law into harmony with the Civil Service act. The present statute has been held void by the Attorney-General, and the proposed change merely strikes out the part so held to be invalid.

Section 4 exempts from inspection vessels while out of commission. Frequently vessels are laid up two or three years and their equipment removed. There is no reason why they should be inspected. This proposed change allows of proper exemption being made by regulation.

The Boiler Regulations.

Section 5 is the most important feature of the bill from the boiler manufacturers' standpoint. It provides for the amendment of Section 4418, Revised Statutes, by so broadening its scope and eliminating detailed specifications as to make it practicable to repeal Sections 4434, 4435 and 4436, Revised Statutes, which embody the specifications upon which boilers are now required to be constructed, and which are stricken out of the law by Section 14 of the pending bill. Section 4418, as amended, will read as follows:

The local inspectors shall also inspect the boilers and their appurtenances in all steam vessels before the same shall be used and once at least in every year thereafter. They shall subject all boilers to the hydrostatic pressure, and shall satisfy themselves by thorough examination that the boilers are well made, of good and suitable material; that the openings for the passage of water and steam, respectively, and all pipes and tubes exposed to heat, are of proper dimensions and free from obstructions; that the spaces between and around the flues are sufficient; that flues, boilers, furnaces, safety valves, fusible plugs, low water indicators, feed water apparatus, gauge cocks, steam gauges, water and steam pipes connecting boilers, means of prevention of sparks and flames from fire doors, low water gauges, a means of removing mud and sediment from boilers, and all other such machinery and appurtenances thereof, are of such construction, shape, condition, arrangement and material that the same may be safely employed in the service proposed without peril to life; and that all the requirements of law and regulations in regard thereto have been fully complied with.

It will be noted that the requirements of the above section as amended are general in terms, and permit of the amendment from time to time of all regulations drafted thereunder. The sections of the Revised Statutes relating to construction of boilers which are entirely repealed by the Department's bill are as follows:

Section 4434. No externally fired boiler having its shell constructed of iron or steel plates exceeding an average thickness of 30-100 inch shall be employed on any steam vessel navigating the Red River of the North or rivers flowing into the Gulf of Mexico or their tributaries; and no externally fired boiler employed on any such steam vessel shall have less than 3 inches space between its shell and any of its internal flues, and not less than 3 inches space between such flues when any such flues are more than 5 inches in diameter; and every such externally fired boiler employed on any such steam vessel shall be provided with a manhole in the lower part of the front head thereof, of such dimensions as may be prescribed by the Board of Supervising Inspector, in all cases where the distance between its internal flues is less than 3 inches.

Externally fired boilers having shells constructed of iron or steel plates not exceeding an average thickness of 50-100 inch may, in the discretion of the Secretary of Commerce and Labor, be authorized and employed on steam vessels navigating the Atlantic and Pacific oceans, or salt water bays or sounds, or the great lakes, or any of them, and waters flowing to and from the same, or any of them; Provided, That on inspection no plate that is by this act limited to a thickness of 30-100 inch, and no plate that is by this act limited to a thickness of 50-100 inch, shall be rejected for use if found to exceed those dimensions, respectively, if the average thickness thereof does not exceed the limits therein specified, and the amount of steam pressure that will be permitted to be carried in boilers constructed in accordance with the requirements of this act shall be determined from measurements showing the least thickness of the plates.

Sec. 4435. The feed water shall be delivered into the boilers in such manner as to prevent it from contracting the metal, or otherwise injuring the boilers. And when boilers are so arranged on a vessel that there is employed a water connecting pipe through which the water may pass from one boiler to another, there shall also be provided a similar steam connection, having an area of opening into each boiler of at least 1 square inch for every 2 square feet of effective heating surface contained in any one of the boilers so connected, half the flues and all other fire surfaces being computed as effective. Adequate provision shall be made on all steam vessels to prevent sparks or flames from being driven back from the fire doors into the vessel.

Sec. 4436. Every boiler shall be provided with a good, well-constructed safety valve or valves, of such number, dimensions and arrangements as shall be prescribed by the Board of Supervising Inspectors, and shall also be provided with a sufficient number of gauge cocks and a reliable low water indicator that will give alarm when the water falls below its prescribed limits; and in addition thereto there shall be inserted, in a suitable manner, in the flues, crown sheet or other parts of the boiler most exposed to the heat of the furnace when the water falls below its prescribed limits, a plug of good Banca tin.

The remaining sections of the bill relate chiefly to administrative matters and, like those above described, are designed to eliminate specifications from the law with a view to enabling the Secretary of Commerce and Labor and the Board of Supervising Inspectors to keep the work of the service in line with the best practice by amending the regulations from time to time. W. L. C.

Two New Testing Gauges.

Two useful time saving tools, which will appeal to expert machinists and tool makers, are illustrated herewith. Fig. 1 shows the Hayes patent surface gauge. It may be attached to any standard or arm, but preferably to the arm of an old style surface gauge, and may be used to show unevenness of work when supported on

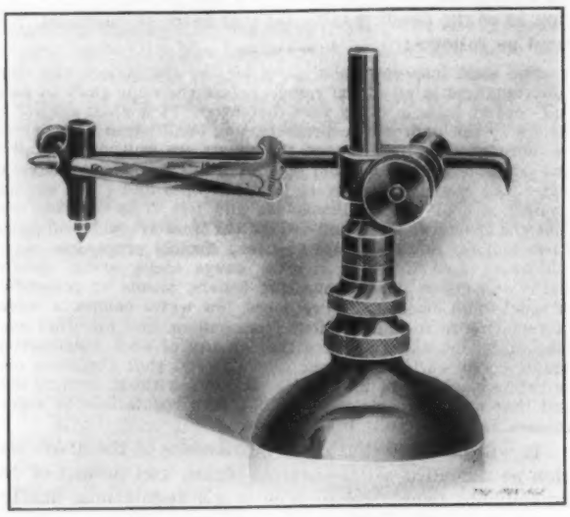


Fig. 1.—Hayes Surface Gauge.

the bed of a planer, shaper or milling machine. An attractive feature of the instrument is the quickness with which it may be used, but most important, of course, is its accuracy. As the work passes back and forth under the point of the surface gauge the finger rises or falls, following any change in the level of the surface. A very small irregularity will be indicated, as the ratio of the arms on the lever is 1 to 30. For instance, the

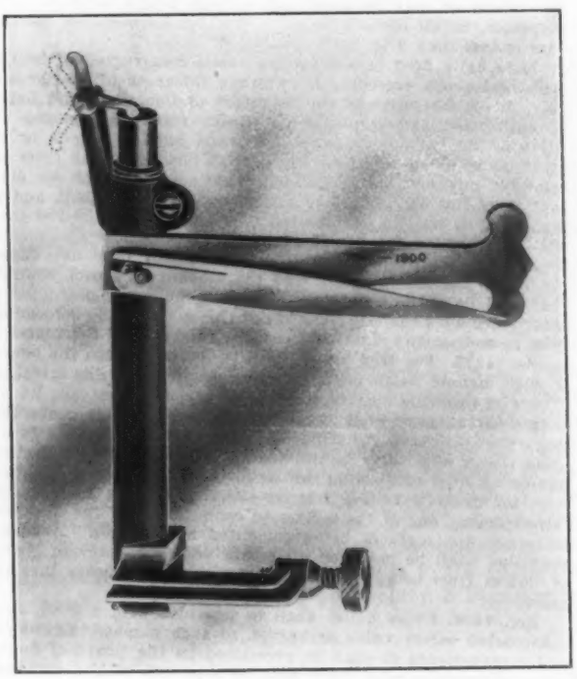


Fig. 2.—Hayes Truing Gauge.

point of the needle will move 30-1000, or about 1-32 inch, where the point of the gauge moves 1-1000 inch.

The Hayes patent truing gauge, shown in Fig. 2, works on practically the same principle as the surface gauge, but is arranged to be clamped to a lathe tool, and by being placed in different positions may be used to test the outside surface of a piece of work, the end or an inside surface if the latter is not less than ⅛ inch in diameter. The small lever at the end of the instrument may be used to test unevenness in surfaces parallel with its long dimension. By the aid of this truing gauge a piece of work which has been removed from the lathe temporarily may be put back again accurately and quickly in its original position. They are many other uses to which either or both of these gauges may be put, such as setting tapers or lining up any style of machine, and the possibilities in other directions will be appreciated by any one having occasion to use an instrument of this sort. The gauges are manufactured by the Ives Mfg. Corporation, Bridgeport, Conn.

Reversing Valves for Regenerative Furnaces.

BY A. D. WILLIAMS, JR., NEW YORK.

There are two classes of reversing valves for regenerative furnaces, quick acting and slow acting. Each type of valve in both classes has some good points and counterbalancing disadvantages. A poor valve is a very expensive luxury, it adds greatly to the fuel consumption and to the difficulty of controlling the action of the furnace. A part of the fuel losses due to a valve, the loss of gas direct to the stack during reversal, can be approximated, but there are a number of indirect losses which cannot be computed. These losses are considerable, and show up with startling distinctness in the large amount of fuel saved by a valve which cuts off both the stack and gas main from the furnace at the time of reversal. A reduction of fuel consumption of from 20 to 30 per cent. has been obtained by the Fischer reversing valve when used for gas only, and in some cases the results have exceeded this considerably. This valve can be applied to the air inlet with advantage. In this case the two valves are so coupled that both are operated by the same lever. Such an arrangement cuts the furnace completely off from the stack at each reversal, and for some classes of work presents many claims for consideration, owing to the simplicity with which the arrangement can be made. The results are visible not only in reduced fuel consumption, but in the product, due to the closer heat control attained.

The ordinary Siemens or butterfly valve is an ideal arrangement, simple and rapid in action, two most desirable qualities, but it has very serious disadvantages. When new this valve leaks a trifle, and this gas burns in the valve owing to the surplusage of air in the flue gas. The resulting heat and the hot gases passing soon cause it to warp, and thus increases the leakage and rapidly destroys the valve. Numerous efforts have been made to use cooling water in valves of this design. The resulting structure is somewhat complicated, and requires constant watching. Such valves develop cracks very quickly if the supply of cooling water is interrupted, and the leakage of water is not good for either valve or flues; besides it reduces the stack draft by cooling the gases of combustion.

The slower acting valves do not lose much through continual leakage, but it takes time to operate them, and unless the gas main and furnace are cut off from the valve at this time a considerable amount of gas escapes up the stack, and more or less cold air is drawn into the furnace around the doors. The air drawn into the furnace chills it slightly, and this means an increase in fuel, additional to the stack loss, and causes a part of the continual trouble with the brick work around the doors. This cold air settles on the charge, and has an oxidizing effect, which while it may be slight at each reversal is a constant drain. It also adds to the difficulty of controlling the operation of the furnace.

A water seal is very effective in preventing gas leakage, but it requires eternal vigilance. A very slight increase in gas pressure will force the seal, carrying water over into the flues and permitting the gas to escape up the stack. Unforeseen failures of the water supply often occur, and put such a valve completely out of business until a bucket brigade can be organized. A large water surface is exposed to the incoming gas, which is at least 200 degrees C. (360 degrees F.) hotter than the boiling point of water, hence some steam is generated and carried along

in the gas. This steam is decomposed in the checkers or furnace and burns as water gas, but it takes more heat to generate this gas than its combustion produces. Then, too, a part of the oxygen in the steam will combine with the CO in the producer gas in the checkers, and combustion here is highly undesirable in its effects upon the checker brick in particular. The products of combustion also pass over a water surface at a high temperature and generate steam, which cools them off and reduces the stack draft.

It is possible to cut off the loss of gas from the main direct to the stack by closing the regulating valve, but this calls for constant attention to this valve, and as soon as the supply has been properly regulated it is time to reverse, and the performance commences all over again. An additional valve can be put in to avoid disturbance of the regulating valve, but while this avoids interference with the gas regulation, it is practically impossible to persuade the operator to make use of it, except when the superintendent is around.

Reversing valves are usually located beneath platforms and in positions where they will be out of the way, hence valve troubles are rarely discovered until they show in the furnace.

Valves have been designed that avoid a great many if not all the above disadvantages, but this is usually attained by the sacrifice of simplicity, and except for the smaller sizes, such valves must be operated by power, which means additional parts to be kept in order. It is hardly necessary to state that around a furnace simplicity is absolutely essential; repairs often must be made when seconds are precious, and the valve being the key upon which the operation of the furnace depends should be the best obtainable.

Very few of the losses due to poor or imperfect valves are susceptible of calculation, but the amount of gas lost during reversal can be approximated. The amount of gas lost in reversing will vary greatly, according to the size of the valve and its rapidity of operation.

An effort has been made to arrive by computation at the amount of gas lost up the stack of an open hearth furnace of 50 tons capacity under prevailing operating conditions, and the following assumptions are made as a basis to work on:

Capacity of furnace		50 tons.
Number of heats made per week		15
Average time per heat		8 hrs. 30 min.
Coal consumption per ton of steel	772 lbs.	350 kg.
Diameter of air valve	48 in.	1,200 mm.
Diameter of gas valve	40 in.	1,000 mm.
Diameter of stack	5 ft. 8 in.	1,700 mm.
Hight of stack	164 ft.	50,000 mm.
Average temperature outside air	+59° F.	+15° C.
Average temperature of stack gases	+932° F.	+500° C.
Average temperature of gas in main	+662° F.	+350° C.
Pressure in gas main	1.5 in. water.	40 mm. water.
Barometer	30 in.	761 mm.
Average time required to throw valve over		15 sec.
Average number of reversals per hour		4
Specific gravity of producer gas, about		0.97

The intensity of the stack draft due to the difference in density between the outside air and the column of hot gas will be found as follows:

The density of air or its specific weight per cubic meter at 0 degree C. is 1293 kg., and varies in accord with its absolute temperature.

$$\text{Density of air at } +15^\circ \text{ C.} = D = 1.293 \times \frac{273}{273+15} = 1.226.$$

There is a slight difference in specific gravity between air and the products of combustion or stack gases, but it is so small that for the purpose of this computation it will be neglected.

$$\text{Density of stack gases at } +500^\circ \text{ C.} = d = 1.293 \times \frac{273}{273+500} = 0.457.$$

f = intensity of draft in millimeters of water.

h = hight of stack in meters = 50.

D and d = as above density of air and stack gases.

$f = h\,(D - d)$.

$f = 50\ (1.226 - 0.457) = 38.4$ mm. of water = 1.51 inches of water.

The velocity of the stack gases due to this head is found by the following formula, which makes no allowance for friction

$$V = \sqrt{2\,g \times 800\,H}.$$

In which

V = velocity in meters per second.

g = gravity = 9.810 meters.

H = head in meters of water = 0.0384.

800 = the ratio between the hights of columns of air and water which produce the same pressures at equal temperatures.

$V = \sqrt{2 \times 9.81 \times 800 \times 0.0384} = 27.54$ m. per second = 90.5 feet per second.

The gas supplied is under a slight pressure as it enters the reversing valve, and the stack flue is slightly below atmospheric pressure, hence the gas will have considerable incentive to escape into the flue. Its velocity, neglecting friction, is found by the preceding formula, the value of H being increased by the amount of the gas pressure.

$V = \sqrt{2 \times 9.81 \times 800\ (0.0384 + 0.040)} = 35.08$ m. per second = 115.09 feet per second.

A portion of the gas passing the valve ignites owing to surplus air in stack gases, and this will raise the temperature of those gases sufficiently to overcome the entry head and a portion of the stack friction, and if the valve takes long to throw or does not seat properly, it may even increase the velocity of the stack gases somewhat. The stack area being a trifle in excess of the combined area of the air and gas valves will not have any tendency to choke the flow. To be on the safe side it will be assumed that the velocity of the gas will be the average between the two velocities calculated, or

$$\frac{35.08 + 27.54}{2} = 31.31 \text{ m. per second} = 108.15 \text{ feet per second}$$

and a deduction of 10 per cent. made to cover friction, making a net velocity of $(31.31 \times 0.9) = 28.18$ m. per second (92.45 feet per second).

The gas valve is 1 m. (40 inches) in diameter, having an area of 0.78 sq. m. The quantity of gas that can pass it at this velocity will be $(0.78 \times 28.18) = 21.98$ c. m. (745.1 cubic feet) per second. During a portion of the time the stack damper and gas controlling valve will cut down the quantity of gas, and besides it will take a second or two to affect the stack draft when the valve is being thrown over. Allowing for a reduction of 35 per cent. from these causes the amount of gas lost per heat will be 21.98 c. m. × 65 per cent. × 4 (reversals per hour) × 15 (seconds required to throw valve) × 8.5 (hours per heat) = 7286.5 c. m. gas lost per heat = 257,333.8 cubic feet gas lost per heat.

The gas is under a slight pressure, and correction must be made for this as well as for its temperature in determining the amount of coal required to produce this quantity of gas.

$$\text{Correction factor for pressure} = \frac{10{,}344}{10{,}344 + 40} = 0.996.$$

40 = pressure of gas in milimeters of water.

10,344 = pressure of atmosphere in millimeters of water.

$$\text{Correction factor for temperature} = \frac{273 + 350}{273} = 2.28.$$

350 = temperature of gas in degrees Celsius.

273 = absolute temperature of 0° C.

One kilogram of coal (2.2 pounds) produces 3.7 kg., or 3.54 c. m., of gas at 0 degrees C. pplying the correction factors for temperature and pressure:

The gas from 1 kg. of coal at 350° C. = $3.54 \times 0.996 \times 2.28 = 8.04$ c. m.

Coal required to produce 7286.5 c. m. of gas at 350° C. $= \frac{7286.5}{8.04} = 906.4$ kg. = 1998.3 pounds.

The coal considered is much above the average, and the less the quantity of gas given per pound of coal the more of it will be required.

The foregoing computation shows a loss of 1 ton of coal per heat, or 750 tons per year of 50 weeks. Say 700 tons, to allow for contingencies, and assume that it costs $2 to place a ton of coal in the producer and dispose of the resulting ash. On this basis $1400 is wasted per year, and a good valve that prevented leakage or at least reduced it to a minimum would be a first-class investment, aside from its additional value in giving closer control of the operation of the furnace.

Charles H. Perkins.

Charles Henry Perkins, general manager of the Rhode Island Perkins Horse Shoe Company, and one of the best known business men of Providence, died at his home in that city on Saturday evening, April 2, after less than 24 hours' illness, in the seventy-fourth year of his age.

Mr. Perkins was born in Taunton, Mass., August 27, 1830, and received his education in the schools of his native town. After leaving school, he learned two trades, those of blacksmith and machinist, and his knowledge of these led to the inventions which were the basis of the fortune acquired by him in later years. After finishing the periods of his apprenticeship he had charge of repairs of cotton mill machinery for ten years, working for Hosea Ballou and for Milton Morse in Connecticut.

In 1857 he invented the first machine for making horseshoes, and a year or two later he moved to Providence and formed a partnership with E. A. Cutler, under the firm name of Cutler & Perkins. Out of that business grew the Union Horse Shoe Company, which was located on Point street. The company made many horseshoes

CHARLES H. PERKINS.

for the Union army during the Civil War. Before the war was ended Mr. Perkins established the Perkins Sheet Iron Company, a concern that rolled the first Russia iron made in this country, but a combination of importers placed the price of Russia iron at a figure that proved the ruin of this industry, and out of it was started the Rhode Island Horse Shoe Company in 1867, of which Mr. Perkins was manager. This mill was at Long Pond, and was part of the vast industries owned by A. & W. Sprague. Mr. Perkins was manager of the Sprague's iron works business, which included, besides the horseshoe company, the Sprague Mowing Machine Company and the Comstock Foundry Company.

After the Sprague failure in 1873 Mr. Perkins, with F. W. Carpenter and R. W. Comstock, bought out the Rhode Island Horse Shoe Company and moved the plant to Valley Falls, beginning business there in January, 1875. The company reorganized in 1891, as the Rhode Island Perkins Horse Shoe Company, and Mr. Perkins was general manager of the corporation until his death. His inventions for horseshoe machinery were the basis of the extensive business that was built up by the concern.

In addition to his position at the head of the horseshoe company which bears his name, Mr. Perkins had extensive business interests in other lines. He was president of the Perkins Land Company, a director and vice-president of the old Union Railroad Company, and a director of the Manufacturers' Trust Company.

As a business man, Mr. Perkins possessed the rare combination of inventive genius and business capacity. His inventions in the horseshoe line have become the basis of the business, and are in use by every company in this country making shoes to-day, and there have been few improvements in the horseshoe line that did not originate in his brain. He was the first man to discard gears and to substitute belts for the propulsion of small mills in rolling mill practice. While connected with the Union Railroad Company, he superintended the construction of their first power house, which at the time was considered one of the most complete in the country. He was a Free Mason and a Knight Templar. He took an active interest in public affairs, serving as a member of the Common Council in 1866, 1867 and 1871, and afterward as a member of the lower branch of the General Assembly for two terms. In 1896 he was one of the State's Presidential electors.

Mr. Perkins was twice married, and his second wife survives him. He also leaves three sons and one daughter.

The Chicago Pneumatic Tool Company.

At the adjourned annual meeting of the Chicago Pneumatic Tool Company, held April 2, the retiring Board of Directors was re-elected. The three directors of the company whose terms were about to expire are J. R. McGinley, Pittsburgh; Joseph Boyer, Detroit, Mich.; Archibald W. Maconachie, London, England.

The directors held their meeting on April 4 and action was taken which, it was authoritatively stated, means the complete reconciliation of all the interests in the company and the continuation of the present management. J. W. Duntley was re-elected president without opposition. At the same time a new office, that of chairman of the board, was created at the express request of Mr. Duntley, and to this office was given special powers, including supervision over the financial affairs of the company. J. R. McGinley, one of the directors re-elected at Saturday's meeting of the stockholders, and who has been identified with the various Westinghouse companies for many years, was made chairman of the board and also of the Executive Committee, which consists of Mr. McGinley, Mr. Duntley and Charles M. Schwab. W. O. Duntley was re-elected vice-president. S. W. Price was elected secretary and treasurer, to succeed John B. Milliken of Chicago. W. B. Seelig was elected auditor, and W. J. Calhoun, general counsel.

Following is a statement of the surplus and profits for 1903, submitted at the stockholders' meeting:

December 31, 1903—Dr.	
Depreciation of plant and inventories, including repairs and renewals of building and plant	$118,213.12
Additional reserves for accounts receivable	11,116.30
Bond interest for the year	115,000.00
Sinking fund installment	50,000.00
Dividends aggregating 6 per cent. per annum	361,979.50
Appropriation of balance of profits in writing off extraordinary and other legal expenses in connection with infringement of company's patent rights and cost of consolidation of Cleveland and Aurora plants	45,155.34
Balance surplus forward	113,706.37
Total	$815,170.63
January 1, 1903.—Cr.	
Balance of surplus	$113,706.37
December 31—	
Profits for the twelve months, including amount saved on purchase of bonds for sinking fund 1903	701,464.26
Total	$815,170.63
January 1, 1904—	
Surplus	$113,706.37

The following balance sheet as of December 31 last was also submitted:

Assets.—Real estate, buildings, plant, machinery, patents, good will, less reserves, $6,344,206; capital stock of other companies and other investments at cost, $1,119,125; cash, $120,789; accounts and bills receivable, less reserves, $578,287; inventories, $532,889; sinking fund investment, $120,875; total, $8,816,171.

Liabilities.—Capital stock, issued, $6,032,900; first mortgage bonds issued, $2,300,000; interest accrued on bonds and dividends unpaid, $103,832; accounts and vouchers payable, $127,864; sinking fund for redemption of bonds, $120,875; reserves for taxes and suspense items, $16,994 (contingent liability on bills discounted, $9,539); surplus, $113,706; total, $8,816,171.

President J. W. Duntley, in his report to the stockholders says:

"Early in the past year your plant in Aurora was shut down and the majority of the tools and machinery moved to your Cleveland plant. This was in continuance of the policy announced on the organization of the company of concentrating production so as to reduce cost of manufacture and of administration. Your directors have preferred to charge all of this cost of combining the Cleveland and Aurora plants against the surplus this year. The productive capacity of the plants at Detroit, Cleveland and Franklin has been greatly increased, so that the capacity of these three is materially greater than the previous combined capacity of your five plants. In addition, much has been done to standardize the various operations in the manufacture of the product of your company, which further increases capacity and cheapens the cost.

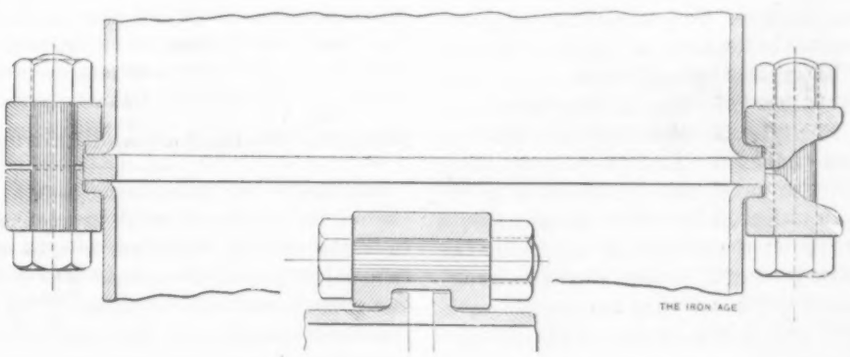
"After the several companies came into the control of this company and after careful investigation, it was found advisable that certain types of tools be abandoned. In further pursuance of this policy of offering for sale only the most efficient tools, your management have taken back many tools put out by the old companies and replaced them with improved tools, making liberal allowances for the old tools. The old tools so returned have not been valued in your inventories. These returns were notably large in the case of the Standard, Chisholm & Moore and Franklin tools. The air compressors have been completely redesigned. All the cost of old tools taken back and of redesigning tools and compressors has been charged against profits. The foreign company, of which you own the entire stock, has expended large sums for the extension and broadening of its field of operations, and its earnings have accordingly been reduced to that extent. These expenditures were deemed necessary in order to develop future business. During the last year, as you are aware, there have been many disturbances of trade. The effect upon our business for the year, due to these differences between employees and employers, has been notable. In shipyards, in the building trades, in car works and structural iron and steel companies has been shown a very marked reduction of expenditure for tools and equipment. Notwithstanding these conditions, the net profits for the year ending December 31, 1903, are shown to exceed $700,000, subject to deduction of fixed charges. The net profits of the year, as above stated, have been determined after charging to cost of operation the cost of the development and introduction of new lines of tools, and the retiring of old and unsatisfactory tools.

"Your attention is called to the aggregate quick assets of $1,246,027.58, against which are current liabilities of $238,000, which includes accrued interest on bonds and dividends payable January 15. These items have since been paid, and at the date of this report the outstanding accounts and vouchers payable, bond interest accrued but not due, aggregate less than $125,000. The company have probably paid all interest and sinking fund charges under the mortgages, securing its outstanding bonds. The company owe no borrowed money and have outstanding no notes payable. During the current year, although the expenditures in improvements and permanent investment greatly exceed the amount, but $44,313.39 has been charged to capital account, while in repairs and expenses of consolidating your Aurora and Cleveland plants, experimental work and the writing off of obsolete material, over $118,000 has been charged to profits and surplus."

The Lovekin Patent Loose Flange Pipe Connection.

One of the problems engineers encounter in laying out and erecting steam piping is the obtaining of a connection that will be absolutely tight and yet not involve the use of awkward and expensive flanges. A study of the loose flange connection illustrated herewith will show how this problem has been solved by L. D. Lovekin, chief engineer of the New York Shipbuilding Company, Camden, N. J.

Special attention is called to the junction of the joint ring against which the pipe ends bear. The ends of the pipes themselves are flanged and form the joint surface, while the loose flanges serve simply as a powerful clamp to hold the pipe flanges in contact with the joint ring. The latter provides a good surface for the flanged ends of the pipe, and also serves on its outer rim as a strut to resist the distortion of the loose flanges due to the tension of the bolts. This fitting of the loose flanges over the joint ring is a special feature by means of which the effective section of the loose flanges becomes equivalent to the combined areas of the flanges and ring. An internal pressure tending to distend the ring adds to its strength against collapse, sets up a moment which offsets the moment of the bolts, tending to distort the loose flanges, increases the tension of the bolts and tightens the joint.



THE LOVEKIN PIPE JOINT.

This type of joint allows the loose flanges to be smaller in diameter than any type of fixed flange, as the bolt heads and nuts may be brought close in to the pipe; hence a neater and lighter design is possible, especially for large sizes. For work in close quarters and filed work generally this joint is particularly convenient, as the flanges can be revolved into any position required. The holes are drilled in the shop, so that the work may be done accurately and cheaply, and the joint ring is not put in place until ready to couple up. The loose flanges may be made of any suitable material, cast or wrought iron, but the latter is preferable, as it is less apt to break. The section of the flange may be modified to suit material, as shown in the illustration.

For turning over the flange on the pipe Mr. Lovekin has designed an expanding and flanging machine, on which pipes of any size from 2 to 24 inches may be flanged cold, and the work rolled over so smoothly that no machining is necessary. This joint may be applied to copper and wrought steel or iron piping. In the case of copper piping it does away entirely with brazed joints, a feature which will appeal to engineers who know the danger of brazed connections. For extremely high pressures in steel pipe another type of joint is shown, where the pipe is upset and flanged over while hot.

The Iron Age

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Can International Competition be Controlled?

An interesting suggestion comes from Germany. The statement is made that the new German Steel Syndicate is about to open negotiations with British and American steel companies to see if some scheme cannot be arranged to limit the respective fields of interest of all companies in the world's markets so as to obviate existing competition. This is an important announcement, which may not have an actual foundation in any action thus far undertaken by the syndicate. It may be assumed, however, that it is hoped for. The syndicate would unquestionably be pleased to secure better prices for exported products than must now be made under unrestricted competition in international markets. We have seen partial movements of this character in the past. At one time the rail manufacturers of the leading rail producing countries of Europe had an arrangement of this kind, which continued for many years. The tube manufacturers also operated under an agreement of the same sort. Some years since the leading manufacturers of wire in this country attempted to effect an understanding with the wire manufacturers of Germany for the purpose of controlling the world's trade in wire products. It may, therefore, be assumed that this is not simply a play of the fancy of some German writer, but that it may be one of the ultimate aims of the syndicate.

The conditions which prevail in the leading iron and steel producing countries are not so unfavorable to a scheme of this character as might at first appear. Under the operations of the syndicate just completed in Germany, the steel trade of that country is now more thoroughly controlled by a central body than in any other country. In this country the United States Steel Corporation would, of course, be the main body with which the manufacturers of Europe would attempt to secure an understanding. But while this corporation control the greater part of the steel output of the United States, other large American producing interests would have to be considered who are now participating in the world's trade. These include rail, plate and structural steel manufacturers principally. Possibly there are so few of them that it might be a comparatively easy matter to get them together on such a proposition. In the case of Great Britain, it might appear at first blush that an attempt to get the various manufacturers there to unite for such a purpose would be hopeless. In that country no great consolidation like the United States Steel Corporation exists at present, nor is there any association of manufacturers at all comparable to the recently formed German Steel Syndicate. Nevertheless, the steel interests of that country are in such condition at present that probably eight or ten men could, if they felt favorably toward such a scheme, swing the steel exporting interests of the United Kingdom.

The influence of such an arrangement upon the trade of the world would be most important if it could be accomplished. It would avoid the present system of dumping surplus production in the home markets of other producing countries. The manufacturers of each country would be assured certain markets in which their products would be sold at prices yielding a satisfactory profit, instead of being sold either at no profit or at a loss as at present. The very unsatisfactory results of dumping would be avoided in other respects. No material would then be sold to outside manufacturing consumers at prices which would enable them to work the material into more highly finished products and undersell the makers of such finished products in the country of original exportation. The arrangement would, of course, not be in the interest of consumers in those countries which, being unable to produce their own iron and steel, are dependent upon the leading industrial nations.

If an agreement of this kind should be made, it will only be established upon a basis which will thoroughly protect those in it from bad faith on the part of any other members. No international arrangement could be entered into which would simply depend upon ordinary verbal or written agreements. The opportunities for evasion would be so great that it would be necessary to provide against them by stipulations of the most rigid character. The difficulties in making an agreement of this kind would seem to be almost insurmountable. Nevertheless, we have seen in these latter days what appeared to be almost as great difficulties surmounted and schemes accomplished that at first blush were declared to be impossible. It will, therefore, not be advisable to declare this project improbable.

Shippers' Associations and Railroad Inequalities.

Chicago is now endeavoring to form a shippers' association, the objects of which are not only to correct inequalities of local rates, but to take cognizance of certain unjust phases of railroad laws and customs which have been forced upon shippers by the carriers through persistent insistence on their prerogatives secured from legislative bodies. The railroads have been for years a united, disciplined army under skilled leaders in the legislative bodies, while the shippers have been an unorganized mob, each seeking his own individual benefit. It is not strange that such a force acting year by year has made inroads into the rights of the shipper, just as labor unions, through their State and national federations, have driven unorganized capital to its present fight in the last ditch. The wonder is that the railroads have been as temperate and considerate as they have been.

That the present bill of lading is a one-sided document, binding the shipper but not the carrier, is generally conceded. That carriers should be made financially responsible for delays due to their own shortcomings is axiomatic. That demurrage should be charged to the consignee on 48 hours' notice and not on the carrier for weeks of delay is unjust. That rates quoted by the railroads by telephone, word of mouth or letter are practically worthless when it comes to collecting overcharges in freight bills is patent to every shipper. That vast sums of money in interest and principal are lost annually by shippers through railroad overcharges, and that these losses would be still greater did not large shippers employ a force of men to follow up their claims, are only too well known by the shippers themselves.

But what can any individual shipper do about it? What can isolated shippers' associations do about it? Twenty other cities have long had similar associations, actuated by laudable motives, and no marked result has accrued aside from lucrative positions to the men who have fostered the movement. On the other hand, and in justice to the carriers, it must be conceded that railroad rates are usually based on a cost of operation aver-

aging ½ cent per ton per mile to the nearest competing point plus a fixed profit—a rate that is as fair to one consignee as another, as fair to a shipper at Pittsburgh as at New York or Chicago. Local rates may be distorted or influenced as a result of local pressure and special conditions of carrying cost for a time, but the network of rates is so interwoven, so interdependent, that rates are sure in the long run to be equalized on the basis of actual cost of carrying. This is even true of the much discussed Pacific Coast rate, which is less for New York or Pittsburgh or Chicago to the coast than to such intermediate points as Salt Lake City and Spokane, on the theory that the volume of through freight carried at the very low rate competing with ocean shipment permits the making of a lower rate to intermediate points than would otherwise be possible. In other words, that while the rates to Salt Lake City and Spokane, for instance, are higher than to the coast, they would be still higher if the roads were prevented from carrying coast bound freight at the low rate now charged. The theory is this: A train of 30 cars—10 for Salt Lake City and 20 for San Francisco—can be carried through Salt Lake City to the coast at very little greater total cost than a train of ten cars to Salt Lake City alone. Prevent the railroads from competing with ocean rates, and it will cost more to carry the ten cars to Salt Lake City alone than the present rate.

If there are abuses in railroad practice, injustices built up by persistent and inspired legislative enactments, as there doubtless are, no one city can remedy them. It is only by a federation of the various shippers' associations that anything can be accomplished. Will it be possible for 20 associations of the kind, each of which is intent on getting the best of the other in the matter of rates, to federate? Such things have been done in other lines in the face of seemingly insurmountable differences and conflicting interests. Until this is done by the shippers' associations, working on the broad basis of equal rights to all, nothing permanent will be accomplished aside from the drawing of good salaries by local managers.

National legislation has endeavored to prevent rebates to large shippers and has succeeded in a fair measure. But there are to-day violators of these national enactments who secure rebates through little local railroads of high sounding names which they have built for the purpose. Some of these railroads are a half mile long; some have ten miles of track, some a little more, but all have a full list of officers in the Red Book and give finely engraved passes to whomsoever they think best. These railroads are built for the purpose of securing rebates in freight charges under the guise of switching tariffs, and they do their work well; how well, the owners themselves know best. This phase of the tariff situation, however, is now being taken up by the highest authorities, and a decision will one day be rendered that expresses the latest judicial thought on the subject. If these decisions are not just to the shipper who has not built his one mile of switch track and has not engraved his own annual passes, the subject will come up again and again until justice is accomplished. Like Banquo's ghost, it will not down.

Railroads, like other undertakings, are built and operated for the purpose of making a profit for their stockholders. If this profit cannot be secured in the ordinary channels of business, their officers naturally cast about for expedients that will result in profits. Some of these expedients—to be just, most of them—are for the general good as well as for the profit of the railroads, but some are extortionate and unjust. To condemn railroads out of hand as robbers is sheer nonsense, but to federate the interests of shippers to correct manifest wrongs is the highest form of patriotism, provided the motives and methods are right.

Heavy Contracts Pending in the Foundry Trade.

Manufacturers of foundry pig iron are greatly interested in some of the undertakings which are now developing. Seldom have there been so many large pieces of work in sight for the foundry branch of the iron trade. First in importance is, of course, the tunnel work now about to be undertaken by the Pennsylvania Railroad Company in the vicinity of New York City. This work in its entirety has previously been stated to be the greatest iron contract in point of tonnage ever placed. The quantity of castings will be about 300,000 tons. Another important project involving foundry work is the great improvement in the water works of St. Louis, which will require 100,000 tons of pipe. The city of New York has also just decided to install a high pressure fire service system, which will take 80,000 tons of cast iron pipe for its purposes. The city of Cincinnati is further engaged in improving its water system and 50,000 to 60,000 tons are expected from there. These demands upon the foundry trade are coming at a time when an increase in the demand for foundry iron will be most welcome. All the work contemplated cannot be completed this year, so that the tonnage will not be entirely felt as an addition to the year's business. Its influence, however, must certainly be felt by the foundry iron trade.

The agreement under which the German Steel Syndicate is operating has been drawn up with some unusual features which aim to safeguard the assenting interests and at the same time put a check upon the investment of fresh capital in plants built to sell. In order to meet growing outside competition the syndicate has adopted clauses under which a dissolution is provided for when outside interests develop beyond a certain tonnage. To illustrate this point, it takes a vote of 75 per cent. of the companies included in the syndicate to decree its dissolution when there has been added to outside capacity enough to equal 5 per cent. of the total tonnage allotment of the syndicate works. If the additional outside competition exceeds this 5 per cent., a simple majority vote of the companies suffices to dissolve the syndicate.

Heyl & Patterson, Pittsburgh, have received a large contract for the construction and equipment of a coal washing plant at the works of the Dominion Iron & Steel Company, Sydney, Nova Scotia. The plant will have a capacity of about 1000 tons per day, and will be one of the largest coal washing plants ever built.

The Cambria Steel Company, Philadelphia, Pa., announce that they have undertaken the manufacture of steel boiler and structural rivets, ½ inch and larger, and that they will shortly undertake the manufacture of machine bolts and hot pressed nuts.

The Duff Mfg. Company, Pittsburgh, have received a large order for track jacks for the Trans-Siberian Railway. They have also received a rush order from the Japanese Government Railways, and both orders are to be put through as fast as possible.

In one day recently the National Tube Company, Pittsburgh, shipped 128 cars of tubular goods from three of their principal works in the Pittsburgh district.

New Boiler Inspection Rules in Chicago.

An ordinance governing the inspection of steam boilers and steam plants, adopted by the City Council of Chicago March 23, 1903, and amended February 8, 1904, contains provisions concerning which every manufacturer of steam boilers and pressure tanks interested in that market should be advised.

Lack of information concerning its requirements has, in a number of cases, resulted in loss to builders and contractors who have failed to comply with its provisions, which in some points differ from the standards of practice in common use. The sections which affect these interests relate chiefly to rules of construction, erection and equipment, and it is necessary for builders to conform to them in order to secure permits from the Board of Inspectors for the operation of boilers and tanks in the city of Chicago. The features of interest to builders and contractors furnishing boilers and tanks are contained in the following excerpts from the amended ordinance, in which the italicized lines indicate the changes made in the recent revision:

Section 9. It shall be the duty of the board to inspect all boilers, tanks, jacket kettles, generators or other apparatus used for generating or transmitting steam for power, or using steam under pressure for heating or steaming purposes, *and all other tanks, jacket kettles and reservoirs under pressure of whatsoever kind, except as hereinafter provided,* as often as once in each and every year, by making a hydrostatic pressure test where such tests shall be deemed necessary; provided, that the hydrostatic pressure used in such test shall not exceed the maximum working pressure of said apparatus by more than 50 per cent.; and by making a careful external and internal examination. In all cases where hydrostatic pressure test is used an internal examination of said apparatus shall afterward be made. In certifying the working pressure allowed on each steam boiler, steam generator or *other apparatus* the same shall be determined by multiplying *one-fifth* of the lowest tensile strength of any plate in the cylindrical shell of said steam boiler or steam generator or *other apparatus by the lowest efficiency of joint in such cylindrical shell expressed in decimals,* and by multiplying the product by the thickness, expressed in inches or parts of an inch, of the thinnest plate in the same cylindrical shell and divide by the radius, also expressed in inches. This sum will be the pressure allowable per square inch of surface.

* * * * * *

Any boiler may be tested and rated in accordance with the United States Marine Inspection Law governing the inspection of steam boilers. But no boiler, *tank, jacket kettle or jacket constructed or reconstructed of boiler plates hereafter, where the same are required, shall have stay* bolts of less than ⅞ inch in diameter and pitched more than 7 inches apart. *And all stationary boilers, tanks, jacket kettles or jackets carrying a pressure of 100 pounds or over to the square inch, the construction of which requires stay bolts, shall be equipped with hollow stay bolts.* All boiler heads made of boiler plate shall be braced with braces, the sectional area of which shall not be less than 1 square inch each, so pitched that a greater strain than 6000 pounds per square inch of section shall not be carried by any one brace or stay bolt. In computing the strain on braces in flat surfaces the diameter of brace rivets shall be considered. *In computing the strain on shells having dished heads the pressure will be figured according to the radius of the heads.*

According to the provisions of section 11, it is necessary before proceeding with the construction of any new or the reconstruction of any old steam plant to first file with the Board of Inspectors plans and specifications of the same, and until they have been approved no permit can be issued. Not only the boilers and pressure tanks are embraced in this requirement, but it extends to building, stacks and all apparatus connected with the steam plant. Section 12 makes it

unlawful for any person to use any steam boiler or any tank or tanks subject to pressure *other than city pressure,* until he shall have first procured a certificate from said board that said apparatus may be safely used, and that the boiler or boilers, boiler setting, means of producing draft, smoke connections, and furnace or fire box are of such size and capacity that they will do the work required, and be capable of being so managed for the purpose of generating steam that no dense smoke shall be emitted from the chimney connected with such furnace or fire box.

* * * * * *

Provided, however, that this ordinance shall not apply to *tanks, jacket kettles or reservoirs of under 75 gallons capacity, hot water tanks used for domestic purposes, boilers on locomotives* or boilers, generators or other apparatus used in private residences for generating steam for heating purposes.

The provision relating to sales of second-hand boilers and tanks is as follows:

All steam boiler manufacturers, second-hand steam boiler and junk dealers, and any other person or persons selling second-hand steam boilers, tanks, jacket kettles, generators or superheaters, must, before painting the same, have them inspected by the Department of Steam Boilers and Steam Plants, and have in their possession a certificate issued by said department, showing the amount of pressure per square inch the said steam boiler, tank, jacket kettle, generator or superheater is allowed to carry before offering for sale any second-hand steam boiler, tank, or jacket kettle, generator or superheater, and give the buyer the said certificate of inspection. Any person or persons, firm or corporation violating this section shall be liable to a fine of not less than $10 nor more than $100 for each and every offense.

Under a recent ruling of the Board of Inspectors boilers of 30 inches diameter are required to have 2-inch blow off pipe; boilers of 36 inches diameter, 3-inch blow off pipe; boilers of 54 inches diameter and above, 4-inch blow off pipe. Pipes are to be extra heavy and all fittings to be of malleable iron or steel, with a cap bolted on the outer end of pipe beyond the wall.

New Rules on Head Bracing.

Careful attention should be given by manufacturers to the paragraph in section 9, which concerns bracing, since it differs radically in one respect at least from the common shop practice. It will be noticed that it allows no greater strain than 6000 pounds per square inch of section of brace, whereas the usual rule with builders and boiler insurance companies is to allow 7500 pounds. Failure to follow the city's rule in computing brace strains would result in deficient bracing according to the requirements of the ordinance and the refusal of a permit. Care should be taken also to see that all braces have a full square inch of sectional area at weakest net section, for it not infrequently happens that braces otherwise up to specification lack the required area in the flat portion through the rivet hole section. The Board of Inspectors will insist that all braces have the full amount of metal specified at weakest point.

Under the old ordinance the working pressure to be allowed on steam vessels was computed according to the Government rule, but the amended law has adopted the more modern formula which takes joint efficiencies into consideration. It may be pointed out, however, that no rule for calculating these efficiencies has been given in the ordinance, and it presumably rests with the board to say what will be acceptable as a basis for estimating them. There are other paragraphs in the various sections that are lacking in clearness. Some are so generalized in their requirements as to make their application almost entirely dependent upon the board's ruling—as, for instance, in section 12, which enumerates the conditions precedent to the issuance of a certificate permitting the operation of a steam plant. It should be borne in mind that the present board's rulings represent only the majority opinion of the board as now constituted, and that changes in the *personnel* of that body may result in their revision at any time. Since specifications for boilers and tanks are commonly drawn to include compliance with city ordinances and acceptance by the Board of Inspectors, it is apparent, therefore, that upon doubtful points, where the terms of the ordinance are not entirely clear, a specific ruling of the board should be sought.

The ordinance is, on the whole, wisely drawn, and, if administered in a spirit of fairness, will work no hardship on any one concerned, but will do much to safeguard the Chicago public against the danger arising from badly designed and poorly built boilers.

Clairton Furnaces to Start.—No. 2 furnace of the Clairton Steel Company, Clairton, Pa., is being prepared for blowing in and is expected to go in about April 15. No. 3 stack is expected to follow about April 25. No. 1 stack is in blast and the three stacks are expected to turn out between 1200 and 1300 tons of iron per day. Last month an excellent record for production was made in the open hearth plant of the company, the output having been very much larger than in any one month in its history.

The new battle ship "Virginia" was launched April 5 at the yards of the Newport News Shipbuilding Company, Newport News, Va.

Notes from Great Britain.

An Improved Feeling.

LONDON, March 26, 1904.—Contrary to precedent, the iron and steel market is waking up and becoming quite optimistic at the end of the quarter. Usually at this time matters hang fire until after the Easter holidays, but there has been an improvement observable both in spirit and substance for the past few weeks. Pig iron is stiffening, particularly Middlesbrough, with the result that manufacturers, fearing a sharp advance, have bought more heavily than they had intended. During the last few days there have been quite a number of respectable contracts in pig iron. But when one speaks of improvement it must be taken as relative and only comparable to the last few months. It is a plain fact and cannot be too distinctly stated that, compared with a year ago or two years ago, we are still in a bad way.

Although both Americans and Germans are practically off the market at the moment, they would seem to have booked a good number of orders toward the end of last year, if we may judge by the heavy imports during January and February. The most notable item of increase has occurred in blooms and billets, of which we received in January and February over 78,000 tons, which is at the rate of 468,000 tons a year, and this, again, is at the rate of 186,987 tons increase on the year's imports in 1903. The total imports of iron and steel of all kinds up to the present time have not been materially greater than those for the corresponding period of the previous year. The dumped materials have this year come to a larger extent from America than they did for the same period of 1903, but this remark applies mainly to billets and blooms, rails and wire.

British Consumption of Iron Ore.

As showing the relative condition of trade at the moment compared with a year ago the total imports of iron ore during the first two months of the year amounted to only 857,000 tons, which is at the rate of 5,142,000 tons a year, but this happens to be 1,171,000 tons under the actual imports for the year 1903, and is a still greater drop when compared with the actual imports of the years 1901 and 1902. With so marked a decline in the imports of iron ores, it would naturally be expected that prices would become somewhat easier, but, on the contrary, prices of Rubio ore at Cardiff are a trifle stronger than they were, and home prices generally remain unaltered. In the mining of home ores the output has also fallen off. I have in a previous article mentioned that a great mass of information as to various sources of iron ore is being collected through the British consuls in all parts of the world, and it is hoped that before long it will be possible more accurately to ascertain the real economic value of various ore deposits of which at present we hear only rumors. There can be no doubt that many leading iron making firms in Great Britain at the present moment would be only too glad to get possession of foreign ore properties on decent terms. About 60 per cent. of the total cost of producing hematite iron in this country is expended on iron ores.

The British Iron Trade Association.

This week a meeting was held of the British Iron Trade Association, at which a report of the Board of Management was read dealing with the condition of the iron trade, the fiscal question, and other matters. It stated that the volume of home business for 1903 was not what it had been in the previous 12 months. The increase of exports was mainly due in the earlier months of 1903 to pig iron on American account. The condition of the home steel trade had been seriously affected by imports on an unprecedentedly large scale. The fact of so much finished material having been imported for British consumption from foreign countries was a strong evidence of the persistent competition which our manufacturers had to meet in almost every branch of production. The proposals of the Tariff Commission had been put before the members of the association, with the result that 90 per cent. of the replies desired that some change in the present system should be made, while declining in the majority of cases to commit themselves to the precise character of such change. The question of iron ore supplies was next dealt with by the report, which stated that the threatened approaching exhaustion of the iron ore deposits suggested the importance of securing foreign supplies that might either now or at some future time be made available for the British iron trade.

The Barrow Hematite Steel Company.

One or two interesting remarks have recently been made by the chairman to the shareholders of this company on the general condition of trade which are worth record. The decrease in profits is ascribed first to the diminished prices obtainable for the company's products, and, secondly, to a lessened amount of work owing to a distinct falling off in demand. The chairman mentions as a proof of the unsatisfactory condition of the pig iron trade the fact that out of 34 furnaces in operation on the west coast at the beginning of 1903 it has been necessary to put out of blast 12, while the price of west coast hematite pig iron quoted on the Glasgow market at 58s. 6d. at the beginning of the year was quoted at 52s. 6d. at the end of the year. Every 2s. per ton fall in the price of pig iron is an annual loss of £30,000 per year to the company. With regard to rails and other products in steel, the falling off in demand had been less noticeable in this department than in pig iron, but it must be remembered that an additional steel making plant in this country, which had not previously made rails, had gone into the rail trade recently, and, therefore, there was one more works over which the orders for rails had to be divided. The output in the steel making department last year was about 14,000 tons, or three weeks' make less than in the previous year, and the selling price was also lower. Their iron ore mines continued to give a fair quantity of ore, but there had again been a decrease in the output, and that had to be made up by the purchase of ores. No effort had been spared in making explorations in the hope of finding deposits, but up to the present time these had not been successful.

The Purchase of a New Process.

The Harvey United Steel Company have recently purchased another patent. It is public property, of course, that the main Harvey patent expires in England in 1905; in France, Italy and Austria in 1906; in America in 1908, and the licenses under the Krupp patent on December 31, 1908. Naturally the directors are very much alive in the matter of any new process, and so the Charpy process has been purchased, and the directors believe it will considerably prolong the life of the company in the way of royalties. The patents of this company are valued at £280,000, and if the new Charpy process realizes expectations it will clearly add considerably to the capital value of the patents.

Crisis in French Shipbuilding.

Information from France points to a serious crisis in French shipbuilding. Under the Méline system of bounties there was a great rush to build ships, a considerable proportion of which were sailing vessels. Then came the shipping bill of 1902, which was aimed at an increase in the efficiency of the French merchant marine. The result has been disappointing. The shipping bill of 1902 sanctioned a bounty fed credit of 600,000 tons—100,000 tons for sailing ships, 300,000 tons for steamers built in France, and 200,000 tons for steamers built abroad and then placed on the French register.

This tonnage when attained and paid for at the bounty rates mentioned in the bill requires an expenditure of 238,000,000 francs. But for some reason the bill limited the sum to be spent to 150,000,000 francs. The ship owners were quick to secure their share of it. They placed orders for new ships, and the shipbuilders were equally prompt in putting the new vessels on the stocks, and in a very short time scores of ordered ships were placed temporarily on a register provided for the purpose. By way of adding fuel to the flame, the French administration issued a circular urging all concerned to hurry up. In the circular it was stated that if the ship owners wished to participate in the money sanctioned by the bill, the vessels under construction must be finished and ready to be placed on the register without delay, sailing vessels in nine months and steamers in from 18 to 30 months, according to speed and tonnage.

The effect of this circular is certainly very striking. On March 1, 1904, a return was issued which shows, 1, that sailing ships and steamers with a tonnage of 373,276 tons are now on the French register and admitted to participation in the navigation and outfit bounties sanctioned by the bill of 1902, and, 2, that the whole of the credit of 150,000,000 francs is exhausted. This means that if no change is made in the shipping bill of 1902 not an extra ton can receive any benefit from the measure, which was intended to keep the shipbuilding yards of France busy for many years. Thus, if there are to be no more bounties, there is to be no more shipbuilding. Unless the French Government comes to the rescue in a very short time, the French shipbuilding industry will come to a positive standstill. The closing of shipbuilding yards is now one of the foremost questions in French shipbuilding circles. S. G. H.

OBITUARY.

CHESTER D. CRANDALL, manager of the Western Electric Company, Chicago, died March 29. He was born in Jefferson County, N. Y., December 28, 1854. After leaving school he entered the University of Rochester, graduating in 1879. He took a position with the Western Electric Company in July, 1877, where he remained until August, 1881, when he was chosen secretary and treasurer of the Gilliland Electric Mfg. Company, Indianapolis. In March, 1889, he again entered the service of the Western Electric Company. Owing to protracted illness he had not been active in his duties for more than a year. He leaves a widow and a daughter.

HENRY J. SAWE, assistant treasurer and a director of Hibbard, Spencer, Bartlett & Co., Chicago, died suddenly on April 1 at his residence in Evanston, Ill., as a result of heart trouble. Mr. Sawe was just packing up his trunks for a trip to Europe when he dropped dead. He had been with the one firm for 32 years. He leaves a son and a daughter.

MEINRAD RUMELY, president and general manager of the M. Rumely Company, Laporte, Ind., died March 31, at the age of 81 years. He was born in Adelsberg, Baden, Germany, and came to this country when 25 years of age, joining his brother Jacob, who was engaged in the manufacture of pumps in Canton, Ohio, in which city he located in 1847. He was subsequently employed in various cities of the Central West, and learned the machinist trade in Pittsburgh. In 1853 Mr. Rumely, in connection with his brother John, opened a small repair shop at Laporte, and started the business which has since grown into the great threshing machine works, the products of which are sent all over the world. Mr. Rumely conducted the active management of the business up to a few days before his death. He leaves a widow, eight children and 22 grandchildren.

DAVID SHEPARD, vice-president of the Nichols & Shepard Company, Battle Creek, Mich., died March 16. He was born near Skaneateles, N. Y., October 1, 1820. At the age of 28 he moved to Michigan in company with his brother, Charles Shepard, and soon after located at Battle Creek. Soon after his arrival he formed the acquaintance of the late John Nichols, who became his partner in the manufacture of plows and other agricultural implements in a small way. The business grew rapidly, necessitating larger quarters, which were duly provided, and the business became one of the most important in the State. Mr. Shepard was instrumental not only in building up Battle Creek by means of his own large business, but through his influence other industries were located there, and the city is largely indebted to him for its well earned reputation as a manufacturing center. He leaves two sons, F. G. Shepard of Battle Creek, and Albert, of St. Joseph, Mich.

EDWIN A. MILLER, senior partner of the iron and steel firm of Miller, Thornburgh & Co., New York, died March 22 at his home in East Orange, N. J., from pneumonia, aged 36 years.

THOMAS CROCKER, for many years prominently connected with the Cornell Iron Works of New York City, died April 5 in East Orange, N. J., of pneumonia, aged 82 years.

PERSONAL.

Albert Price, who has been superintendent of the Milwaukee works of the American Bridge Company, has been transferred to the Lassig plant at Chicago, under the same title. Mr. Price went to Milwaukee from Pittsburgh at the time of the consolidation of the various companies comprised in the American Bridge Company, and has been superintendent there ever since. The transfer is in the nature of a promotion for Mr. Price, which has been well earned.

B. H. Warren, the newly elected president of the Allis-Chalmers Company, accompanied by his private secretary and Arthur Warren, his brother, who will be one of the superintendents of the company, visited Milwaukee last week on a tour of inspection of the plants located there, including the old works on Clinton street and the new ones at West Allis.

L. L. Arnold has succeeded Mr. Young as superintendent of the Soho furnace of the Jones & Laughlin Steel Company, Pittsburgh.

George Chatterly, for 28 years employed as a machinery expert by the Howard & Bullough Mfg. Company of England and Providence, R. I., and more recently with E. A. Leigh & Co. of Boston, has been appointed examiner of machinery at the Boston Custom House.

John R. Savage, who has been general manager of the Lackawanna Steel Company, has become chief engineer of the Long Island Railroad.

The Canadian Westinghouse Company, Limited, Hamilton, Canada, have recently engaged C. C. Starr, who was formerly connected with the firm of John Starr, Son & Co., to act as their representative in the Maritime Provinces, with headquarters at 134 Granville street, Halifax, Nova Scotia. These provinces are included in the district of the Canadian Westinghouse Company's Montreal office.

David Williams, president of the David Williams Company, publishers of *The Iron Age*, sailed for the Mediterranean on Saturday last.

O. D. Colvin, manager for the American Steel & Wire Company at Seattle, Wash., has resigned to take up the management of the Snoqualmie Falls & White River Power Company.

E. M. Allen, president of the Fayette Mfg. Company, whose works, docks and warehouses are located on the Delaware River, Chester, Pa., has moved the general offices of the company to the eighteenth floor of the Farmers' Bank Building, Pittsburgh, where, in addition to his duties as president of the company named, he will assume the duties of manager of the Magnesite and Chrome Department of the Harbison-Walker Refractories Company, this change having taken effect April 1.

Robert Hubler of Youngstown, Ohio, has been appointed superintendent of the mill of the Elyria Iron & Steel Company, Elyria, Ohio.

Edward G. Elcock of the Hansell-Elcock Company, Chicago, sails for Europe April 7 on the *Prinzess Alice* for a three months' tour through France and Germany.

Archer Brown of Rogers, Brown & Co., New York, in company with Irving Batchelder and Hamlin Garland, left New York April 4 for a six weeks' tour through Old Mexico.

E. W. Bentley, formerly with the Carnegie Steel Company, has severed his connection with that company and is now connected with the Rust Boiler Company, 605 German National Bank Building, Pittsburgh.

Earnest Porter has been appointed superintendent of the open hearth plant of the Carnegie Steel Company, at Sharon, Pa., succeeding William B. Stoop, resigned. This plant has been idle for some months, but will probably be started up at early date. It was formerly known as the Buhl Works of the National Steel Company.

M. A. Neeland, chief engineer of the William Tod Company, Youngstown, Ohio, has been elected president of

the Youngstown Manufacturers' Association of that city. It has been in existence for three years and holds meetings once a month, at which the general interests of the members are discussed. The membership is made up of manufacturing concerns in the Mahoning Valley.

John Warner, assistant to the first vice-president American Sheet & Tin Plate Company has resigned and has been succeeded by S. A. Davis, district manager in charge of the company's Kiskiminetas Valley mills.

Labor Notes.

The Chicago Metal Trades Association held their annual meeting on Wednesday, March 30, at which the old officers were re-elected, as follows: President, John D. Hibbard; vice-president, George C. Purdy; treasurer, J. J. Walser, Jr.; secretary, Paul Blatchford; Executive Committee, the foregoing officers and F. K. Copeman, H. H. Latham, F. S. North and J. W. O'Leary. The policy which has been followed by the association for some time of making agreements with the local unions was upheld and will be continued. Officers of the association are now negotiating an agreement with the machinists' unions based on a slight reduction in wages in harmony with the depression in machine shop business at the present time. It is thought that some such agreement will be effected, and that the usual spring strikes will be avoided.

A strike is threatened by machinists employed at all the shops of the Atchison, Topeka & Santa Fé Railroad, who are members of the International Association of Machinists. The principal shops of the company are at the following points: Corwith, Ill.; Argentine, Kan.; Raton, N. M.; Cleburne, Texas; San Bernardino, Cal.; Fort Madison, Iowa; Topeka, Kan.; Albuquerque, N. M.; Winslow, Ariz.; Los Angeles, Cal. One thousand or more machinists are employed, and in case they strike the boiler makers and blacksmiths would also be required to quit, causing a temporary shut down of the shops and throwing about 7000 men out of employment. Stockades are being built about many of these shops by the railroad officials and provision made for a vigorous defense.

Labor unions in Chicago are apparently massing their forces for some ugly fights during the present month. Long lists of men shot, stabbed and bruised by union strikers are printed in the daily papers nearly every morning, and these lists grow longer each day. Chief of Police O'Neil has made a computation, showing that about 8 per cent. of the whole Chicago police force is now engaged on "strike duty," guarding against damage to property and against injury to nonunion workmen at the hands of union emissaries. The judges on the bench are taking cognizance of the reawakening spirit of anarchy, and are endeavoring to hold the unions in check by injunctions. Judge Kavanaugh in one day issued four injunctions protecting the following 17 firms: Turner Brass Works, W. D. Allen Mfg. Company, Faunt Brothers, Street & Kent, R. Williamson & Co., E. Baggott Company, David J. Braun Mfg. Company, Chicago Gas & Electric Fixture Company, W. S. Edwards Mfg. Company, Federal Company, Charles L. Bastian Mfg. Company, Ripley & Wilson, J. J. Ryan & Co., W. H. Lau Company, Morgan Sash & Door Company, E. L. Roberts Company and Foster-Munger Company. The injunctions are sweeping in their terms, preventing unionists from interfering with the business of the complainants by unlawful means, including, it is contended, the prevention of the calling of sympathetic strikes by business agents of the unions. Of these firms all but three are affected by the brass workers' strike.

Members of the Chicago Brass Manufacturers' Association have posted notices offering a reward of $50 for the arrest and conviction of any person attacking, molesting or interfering with employees of members of that association. This move is made necessary by the increasing number of assaults on nonunion workers in association shops who are taking the place of the strikers.

A few of the structural iron workers employed at Springfield, Mass., are on strike because the employers refused to grant a demand of the Bridge and Structural Iron Workers' Union for an eight-hour day and an advance of $1 a day for outside workers and 25 cents a day for inside men. Most of the members of this union remained at work.

Last week 800 employees of the General Electric Company, Schenectady, N. Y., went on a strike because the company refused to discharge a union man who had been fined for violation of a union rule and failed to pay his fine before 7 o'clock the next morning.

The United States Steel Corporation's Quarterly Earnings.

The directors of the United States Steel Corporation held their regular quarterly meeting on April 5, and declared the regular dividend for the quarter of 1¾ per cent., which is at the rate of 7 per cent. per annum. After deducting the fixed charges, &c., and the amount of the dividend on the preferred stock, there is a deficit for the quarter of $1,857,120. The net earnings for the quarter, with March estimated, were $13,208,886. The statement for the quarter is as follows:

Net Earnings by Months.

	1904.	1903.	1902.
January	$2,868,213	$7,425,775	$8,901,015
February	4,540,673	7,730,361	7,678,583
March (estimated)	5,800,000	9,912,570	10,135,858
	$13,206,886	$25,068,706	$26,715,456

Total net earnings after deducting, each month, the expenditures for ordinary repairs, renewals and maintenance of plants; also interest on bonds and fixed charges of the subsidiary companies		$13,208,886
Less appropriations for the following purposes—viz.:		
Sinking funds on bonds of subsidiary companies	$227,867	
Depreciation and reserve funds	1,717,778	
		1,945,645
Balance		$11,263,241
Deduct:		
Interest on U. S. Steel Corporation bonds for the quarter	$5,802,942	
Sinking funds on U. S. Steel Corporation bonds for the quarter	1,012,500	
		6,815,442
Balance		$4,447,799
Dividend for the quarter on preferred stock of U. S. Steel Corporation, 1¾ per cent.		6,304,919
Deficit for the quarter		$1,857,120

Unfilled Orders on Hand.

March 31, 1904	4,136,961 tons.
December 31, 1903	3,215,123 tons.

It was said, unofficially, that the new system of reporting the earnings recently put into effect made the statement less favorable than it would otherwise have been. Under the new system no account is taken of work done by any of the subsidiary companies—that is, of articles passing from one company to another, until the marketing of the articles is completed.

Meeting of the Machine Tool Builders.

The National Machine Tool Builders' Association will meet in annual session in the parlors of the Grand Hotel, Cincinnati, Ohio, on April 26, and remain in session for two days. The opening address will be one of welcome, and be delivered by the president, Wm. Lodge, of the Lodge & Shipley Machine Tool Company. A. W. Whitcomb of the Whitcomb Mfg. Company, Worcester, Mass., known to be a very able writer, has been requested to prepare a paper, the subject of which has not been made public. Papers will also be read by prominent machine tool men, who are especially well fitted to deal with the several topics on which they will be heard. It is understood that one of the principal topics the convention will discuss is "The Necessity for Modern Machine Tools to Meet the New Conditions that Have Arisen by Reason of the Advent of High Speed Steel."

The Eight-Hour Bill and the Navy.

Rear-Admiral Bowles Points Out Dangerous Tendencies.

WASHINGTON, D. C., April 5, 1904.—What is, perhaps, the most important item of evidence thus far developed in opposition to the pending national eight-hour bill was brought to the attention of the House Committee on Labor during the past week. It is embodied in a letter prepared by Rear-Admiral Bowles, retired, who is now president of the Fore River Shipbuilding Company, but who for several years occupied the responsible post of Chief of the Bureau of Construction and Repair of the Navy Department. Admiral Bowles is strongly opposed to the projected legislation, and states his views with much force and directness.

No Government Witnesses.

It has been the subject of much comment that, although measures practically identical with the pending eight-hour bill have been the subject of extended hearings before the committees of both houses during the past five or six years, no authoritative statement with regard to the effect of the measure upon the business of the Government, and especially upon the navy, has ever been presented. Chairman McComas of the Senate committee, has repeatedly declared that the bill was directed almost solely at the shipbuilders and armor-plate makers of the country, and would affect them only because of their contracts with the Navy Department. While Senator McComas' statements have been very liberally discounted by those familiar with the bill and with the Senator's attitude as a strong partisan of the measure, yet it has been freely conceded that the shipbuilders of the country would be the chief sufferers as the result of the passage of such a measure, and consequently that the Navy Department would be subjected to no little embarrassment owing to the greatly increased cost of war ships and materials of all kinds, the reduction in the number of bidders, the delays in deliveries and the thousand and one other annoyances that would inevitably follow an attempt on the part of the Government to reach out into the States and regulate the hours of labor in private manufacturing plants.

Notwithstanding these facts, and in spite of the efforts that have been made from time to time by the opponents of the bill to induce prominent Government officials to appear before the committees of Congress against the bill, it has been found impracticable to secure the presentation of the desired testimony. Many officials have been disposed to regard the controversy over the bill as one between the manufacturing interests of the country and the representatives of organized labor, in which the Government should occupy a position of neutrality. Others, doubtless, have been deterred through considerations of policy, and as a result the voluminous record of the two committees, which makes several bulky volumes, contains little or nothing of an authoritative character showing the probable effect upon the interests of the Government of a hard and fast eight-hour day in the establishments of Government contractors and subcontractors.

Admiral Bowles' Letter.

The fact has now come to light that Rear-Admiral Bowles, while acting as Chief Constructor of the Navy, did not share the view of his fellow officials that this bill should be allowed to take its course without regard to its effect upon the Navy Department. After the bill had been reported to the Senate by Senator McComas' committee in February of last year Admiral Bowles addressed a strong protest against its enactment to a prominent Senator, and offered to present a detailed argument against the bill if it should be regarded as necessary. As the end of the session was then in sight, Admiral Bowles was not called upon to furnish any additional evidence, and his letter was not made public. Within the past week, however, Robert Hayden, of counsel for the iron and steel interests now opposing the bill, presented the letter to the House committee, and an extract is here published for the first time:

Objectionable Features.

My objections to the bill are contained in the following points:

1. The exceptions to its operation, as contained in lines 18 to 23, are too vague. They will admit of a great variety of interpretations by executive officers of the Government, the manufacturers concerned, and the labor organizations. These will involve the Government in delay, expense, and form a standing invitation to strikes and labor troubles.

2. So far as the navy is concerned there are certain articles, or objects, which are clearly within the operation of the law. For instance, the hulls of vessels, propelling machinery, boilers, pumps, blowers and other special appurtenances of the machinery, windlasses, steering engines, boat cranes, motors, means of communication, armor, guns, ammunition, all special structural material or materials for armament which cannot usually be purchased in the open market, and which will include structural steel, nickel steel, forgings for crank shafts, propeller shafts, rudders, turret mechanism, and a long list of other details of similar character. The cost to the Government of all these articles will be largely increased, probably from 15 to 30 per cent. of the present cost, and the time required for delivery in the same proportion.

3. The competition for Government work by private parties will be largely diminished by the practical impossibility of simultaneous manufacture of Government and commercial work. This reduction of general competition would inevitably result in a great loss of efficiency in naval vessels, which is now promoted by commercial rivalry and the wide range of inventive talent now at its disposal.

4. The inevitable tendency would be to force the Government to build its own ships, to manufacture its armor, guns, steel, forgings, dynamos, engines and blowers in Government establishments.

5. The number of inspectors and clerical employees of the Government would be necessarily increased in order to execute this act.

6. The indirect additional expense ultimately caused to the Government by this act it is impossible to estimate.

7. The private shipyards in the United States capable of building ocean vessels would be crippled, if not destroyed, by this act. These shipyards and their technical staffs have been actually built up and educated by the building of the new navy in the last 20 years. Under the operation of this law they would be obliged either to adopt the eight-hour day, with the impracticable and drastic provisions of this act, or to give up naval work; either of these alternatives means the practical destruction of their business under the present circumstances.

Same Bill Now Pending.

It should be borne in mind that the bill discussed by Admiral Bowles is identical with the measure now pending before both House and Senate committees. It had been amended by the Senate committee by the addition of a number of exemptions which Admiral Bowles characterizes as too vague and as admitting of a great variety of interpretations, involving delay and expense and forming a standing invitation to strikes and labor troubles. It would be difficult to condense into the same space a more comprehensive and forcible statement of the objections to the pending bill than is contained in the Admiral's letter, and its effect upon the Congressional committees is already apparent.

The hearings on the bill before the House committee have been closed, and an executive session will be held on the 7th inst., at which a vote will be taken upon a motion to refer the measure to the Department of Commerce and Labor for an investigation as to the desirability of the proposed legislation, and especially as to its effect upon the interests of the Government. The Senate hearings, which were continued to-day, will probably be brought to a close by the end of the current week, after which the committee will vote upon motions to refer the measure to the Department of Commerce and Labor, to report it favorably or adversely, to postpone indefinitely, &c. The outcome in the Senate committee is quite uncertain, but the opponents of the bill are confident that the House committee will send it to the Department of Commerce and Labor for an exhaustive inquiry.

W. L. C.

In view of the attention being given in the East to the possibility of handling pig iron warrants in a larger way than heretofore, and because the matter was of local interest as well, the firm of Howard M. Hooker & Co., Incorporated, dealers in pig iron and coke, Farmers' Bank Building, Pittsburgh, invited George H. Hull, president of the American Pig Iron Storage Warrant Company, to address a meeting which was held in the Union Club, Pittsburgh, on April 6. The meeting was fairly well attended, and the remarks of Mr. Hull were listened to with a good deal of interest.

MANUFACTURING.

Iron and Steel.

The Alabama Steel & Wire Company expect to have their steel plant at Gadsden in full operation within 60 days. It is practically completed, requiring only some finishing touches, such as connecting the pipes and regulating the machinery. The new furnace at Gadsden which went into blast a few weeks since will supply basic iron for the steel plant, and the greater part if not all of the steel will be converted into rods, wire and nails at the company's Ensley plant. Little if any pig iron will be offered for sale after the steel plant is in operation.

The entire steel plant of the International Harvester Company at South Chicago is now in full operation, with the exception of one furnace. The plant was shut down December 16, throwing 1500 out of employment, and remained idle until March 21, when the blooming and Bessemer departments were started. For a month previous to the resumption of work many needed repairs and improvements were made in all departments of the plant, and men are now at work remodeling the one furnace which is idle.

The trade of the Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, with railway companies, marine boiler manufacturers and the Government of Japan is rapidly increasing. The company have recently received some good orders for double refined charcoal iron hollow staybolt bars from Japan through their agents, Frazar & Co., and the China and Japan Trading Company.

Graham Furnace, Graham, Va., was blown out March 14.

Jefferson Furnace, Jefferson, Texas, which was blown out February 5 is expected to go in blast early in the summer.

Sam Lanham Furnace, Rush, Texas, which was formerly known as Old Alcalde, and which was recently rebuilt, will be blown in April 10. The stack has a weekly capacity of 400 tons.

At the recent annual meeting of the Portland Iron & Steel Company, Portland, Maine, Roland H. Boutwell was elected president, William S. McGowan secretary, and Roswell M. Boutwell treasurer.

The Struthers Furnace Company, Cleveland, Ohio, expect to blow in their Anna Furnace the current week.

The Northern Iron Company, Philadelphia, Pa., who have been operating Cedar Point Furnace, at Port Henry, N. Y., for some time, have leased the furnace for five years. The furnace is to be remodeled and modernized, the principal changes being made at the stack, which will be partially rebuilt and enlarged to 17 x 70 feet. An entirely new set of fire brick stoves will be built and the capacity of the furnace increased to 175 tons per day. The work will require from five to six months. Pilling & Crane are the general agents.

The Central Iron & Steel Company, Harrisburg, Pa., will within a month put into operation their new open hearth department, which has been in course of erection for more than a year. One furnace is now ready for operation.

No. 1 blast furnace of the Carnegie Steel Company at Duquesne has been rebuilt and put in blast. This was the first of the four furnaces built at Duquesne and has been in almost steady operation since 1892, the year in which it was built. This furnace has broken all records for tonnage and has been practically rebuilt. It is expected to turn out a larger output than ever before.

The plant of the Wilkes Rolling Mill Company, Sharon, Pa., which has been idle for some months, has again started up. The company turns out muck bars and sheets.

General Machinery.

The Concord Foundry Company and the Concord Machinery Company, Concord, N. H., have been merged into the Concord Foundry & Machine Company, who were recently incorporated with a capital stock of $60,000.

The Patterson Tool & Supply Company, Dayton, Ohio, are having a good demand for their new Miami Valley lathes, for which they have recently received an important order from a Dayton company.

The East Broad Top Railroad Company, Orbizonia, Pa., R. S. Seibert, general manager, are in the market for a single head 60-inch wheel lathe, second-hand, and a second-hand 2-ton steam hammer for their machine shops.

Considerable machinery will be required by the Orange Iron Works, Orange, Texas, who have purchased a site in Alexandria, La., where they will erect a foundry and machine shop. Plans are not yet completed, and it is not yet known just what machinery the company will have to purchase.

The New England Stone Company, New Haven, Conn., are in the market for a 30 horse-power gas engine, crusher and rolls for crushing granite. The company have purchased property with a frontage of 26 feet on Grand avenue, 130 feet on Clay street and 480 feet on the railroad. On this property there is a two-story building, 100 x 150 feet, which they will overhaul and equip with new machinery for the manufacture of litholite and cast stone products.

The firm of Baugher, Kurtz & Co., Limited, York, Pa., founders and machinists, which were composed of William Eyster, John Strickler and George U. Weiser, have expired by limitation and will be dissolved by mutual consent. The business will be carried on the same as heretofore by William Eyster, John Strickler, George U. Weiser and Frank A. Eyster, who have entered into a limited partnership under the firm name of Eyster, Weiser & Co., Limited.

Application has been made for a receiver for the Defiance Tool Company, Defiance, Ohio. The company have a capital stock of $40,000.

The offices and distributing rooms of the W. Parke Cummings Central Machine Works have been moved into larger quarters at Lancaster, Pa. The machine works will remain where they are now.

The Pennsylvania Forge Company, Philadelphia, Pa., ha e been chartered with a capital of $15,000. Chas. H. Betts of Philadelphia is a director.

The recently incorporated White Engineering Company, Marion, Ohio, have installed a small plant for the manufacture of valve gears air saws and lime and sediment extractors.

Power Plant Equipment.

The J. Thompson & Sons Mfg. Company, Beloit, Wis., have not yet prepared plans for rebuilding their gas engine shop, which was recently destroyed by fire.

The Candee Rubber Company, New Haven, Conn., are to install two Westinghouse tandem compound engines to replace old engines.

J. H. Paine & Sons, manufacturers of marine engines, are operating their new plant at Noank, Conn.

The Wm. Allen & Sons Company, Worcester, Mass., manufacturers of power boilers and heaters, have gone into the hands of receivers. Fred. W. Blackmer and Henry F. Harris of Worcester have been appointed receivers by the Superior Court, with authority to complete existing contracts and to wind up the affairs of the company. The company owe about $40,000. The amount of the assets has not yet been determined. The Allen Boiler Works are one of the oldest concerns in their line in New England.

The Apple River Power Company, New Richmond, Wis., are in the market for water turbine and electrical equipment for a power station.

The Snoqualmie Falls & White River Power Company, Seattle, Wash., with $3,000,000, have acquired the property and business of the Snoqualmie Falls Power Company, White River Power Company, Seattle Cataract Company and Tacoma Cataract Company. The new company will complete the development of the water power of White River along the plans already outlined and noted in these columns about a year ago. About 60,000 horse-power will be developed, but the initial installation will be for 10,000 horse-power, which will be increased from time to time. The plant, it is said, will be the largest west of Niagara. The company have applications for about all of their product.

Foundries.

M. B. Blair, formerly manager of the Parkersburg Casting Company, Parkersburg, W. Va., will engage in the foundry business for himself at New Martinsville, W. Va.

The York Foundry & Machine Company, York, Pa., have been chartered with a capital of $50,000. Israel Laucks of York, Pa., is a director.

The S. Obermayer Company, Cincinnati, Ohio, have recently received several orders for complete equipment for new foundries, including Rockmart Stove & Foundry Company, Rockmart, Ga., and Strow-Morris Foundry & Machine Company, Charleston, W. Va.

The Union Steel Casting Company, Pittsburgh, have bought a large piece of ground adjacent to their works, which will be used in the future for making additions to their plant.

Fires.

The factory of the Derby Silver Plate Cutlery Company, Shelton, Conn., was destroyed by fire March 30, loss $60,000. The machinery is a total loss. It is understood that the factory will be rebuilt immediately.

The plant of the Oil Seed Company, Brooklyn, N. Y., was destroyed by fire April 4. The loss is placed at $75,000.

A recent fire did $4000 damage to the foundry of Philo B. Clark, Rumford Falls, Maine.

The plant of the Brewster Cocoa Mfg. Company, Jersey City, N. J., was destroyed by fire last week. The loss is placed at $50,000.

An air tank exploded in the machine shop of the Erie Railroad, Meadville, Pa., April 2, partially wrecking the building.

Hardware.

A. C. Williams, Ravenna, Ohio, has purchased the hardware specialty manufacturing business of the Sheehan Mfg. Company, Salem, Ohio, including all machinery, patterns, patents and good will, and is dismantling the factory at Salem and moving the business to Ravenna. Mr. Williams has just let a contract for

a 100-foot addition to the finishing department of his plant. A record in the manufacture of hardware specialties is claimed by Mr. Williams in that his factory, employing 200 men, has been operated to its complete capacity every day excepting holidays and Sundays for nine years.

Landers, Frary & Clark, New Britain, Conn., are to erect a large addition to their plant the coming season. The building will be of brick, 50 x 160 feet on the ground and six stories in hight. It will be on Commercial street, and the new spur track from the New York, New Haven & Hartford line will pass on one side of the building. The purpose of the building is for shipping and storage room as well as for manufacturing.

Miscellaneous.

The Railroad Track Equipment Company, Pittsburgh, have applied for a charter, the incorporators being George L. Hall, William M. Hall, Jr., John W. Garland and W. C. Magee. They propose to build a plant at West Pittsburgh, near New Castle, Pa., for the manufacture of insulated railroad track joints and other forms of railroad equipment under patents held by George L. Hall.

The Youngstown Bronze Company, Youngstown, Ohio, have increased their capital stock from $25,000 to $50,000. They intend to make some large additions to their plants, plans for which are now under way.

The American Corundum Company, Bridgeport, Conn., have begun the crushing of corundum at their new plant. The company are incorporated under the laws of New York with a paid in capital of $25,000. The officers are: President, A. B. Townshend of New York; vice-president, George F. Hardy of Bridgeport, and treasurer, B. C. Lyon of Bridgeport. Mr. Hardy, who is the manager, has had 25 years of experience in the abrasive business. Mr. Lyon will look after the office end of the business. Mr. Townshend will not be active in the business at present. The company control valuable corundum deposits in Brazil, and their business will be confined entirely to crushing the ore and preparing it for the manufacturers of abrasive wheels. Their mill is equipped with the most modern appliances for crushing corundum.

The Pressed Steel Tank Company, Milwaukee, Wis., have increased their capital stock from $100,000 to $200,000.

The General Metal Company, 140 North Front street, Philadelphia, Pa., recently incorporated, have installed a plant for the preparation of zinc and copper plates for photoengravers and etchers. T. Lewis Thomas is president, and Edgar J. Ulman vice-president.

The Bison Motor Company, Buffalo, N. Y., have been incorporated with a capital stock of $25,000 for the manufacture of motor vehicles. Directors, Frank I. Alliger, Frederick Wende and Wm. A. Lutz.

The Parlin & Orendorff Company, Canton, Ill., manufacturers of agricultural implements, are planning to greatly increase their capacity both by the erection of new buildings and the installation of additional machinery. To their plant, which now covers 17 acres and employs from 1200 to 1400 men, they will erect four large additions of steel construction. Some of these buildings are to replace the smaller and older buildings which they have outgrown. The power equipment for operating the enlarged plant has been secured. The company have purchased and will soon install a 500 horse-power compound engine and a 500 horse-power Westinghouse generator. A new battery of boilers was added during the winter, giving a total of 1800 horse-power boiler capacity, and the new electrical unit will give, with the engines already in operation, about 1600 horse-power engine capacity. Through their branch houses at St. Louis and Kansas City, Mo.; Dallas, Texas, and Minneapolis, Minn., the company also do a general jobbing business in wagons, vehicles, corn shellers, traction engines, threshers, cream separators, &c.

The Watson Ordnance Company, Pittsburgh, Pa., have been chartered with a capital of $5000. The directors are C. P. Watson, H. A. Jackson and C. W. Smith of Pittsburgh.

Trade Publications.

Grinding Machines.—The Diamond Machine Company, Providence, R. I., have issued a 94-page catalogue on their universal and plain disk grinding machines, which line they recently acquired from the George Gorton Machine Company of Racine, Wis. The pamphlet contains a very interesting description of this form of grinding machine and is copiously illustrated with half-tone line drawings.

Transmission Machinery.—A catalogue replete with information for users of power transmission machinery has just been issued by the Stephens-Adamson Mfg. Company, Aurora, Ill. It is designated as general catalogue No. 7, is 6 x 9 inches in size, and is bound in flexible covers. It has 208 pages and about 1000 illustrations, most of which are excellent half-tones, and innumerable tables of daily usefulness. The half-tone illustrations are supplemented by line drawings of sections of the same appliances giving dimensions. The apparatus described embraces pulleys, couplings, boxes, hangers, brackets, tension carriages, rope drives, belt conveyors, pedestal carriers, mounted carriers, return, concentrating and guide rollers, trippers, sprocket chains conveyor chains of every description, conveyor flights and various other devices belonging in the classes indicated.

Machine Tools.—A 750-page catalogue of machine tools has recently been published by the Niles-Bement-Pond Company, 136 Liberty street, New York City. The pages are about 9 x 12 inches in size, profusely illustrated with large, clear half-tones, and the typographical work is unusually attractive. The catalogue opens with views of the various works of the company and reproductions of diplomas awarded the various constituent companies. The catalogue proper is divided into the following divisions: Railway machinery, including a complete line of driving wheel, car wheel and axle lathes, cutting off and centering machines, quartering machines, car wheel borers and hydrostatic presses; lathes in all sizes, from a bench lathe to 125-inch crank shaft lathe, and special lathes, including pulley and turret lathes, and automatic screw machines; planing machines covering a large variety of heavy planers and illustrating various methods of electric driving; slotting machines; milling machines, with illustrations of work done on the Pratt & Whitney thread milling machine; drilling machines, including vertical, radial and multiple drills; horizontal boring machines, in which the work remains stationary; boring and turning mills, including two very large ones; miscellaneous machine tools; boiler, bridge and shop machinery, including plate planers, bending rolls, punch and shearing machines, hydraulic presses, steam and hydraulic riveters; steam hammers, electric traveling cranes and small tools. Particular care has been taken in the arrangement of the catalogue to put the machines in logical order, to avoid unnecessary use of table of contents or the index, though both of the latter are very complete. Dimensions are given throughout in both English and metric measure.

Ore Concentration.—The Van Meter continuous system of concentration and separation of minerals by means of aluminated hydro-carbon concentrating oil, is described in a catalogue from the manufacturers, W. P. Fuller & Co., 19 Front street, San Francisco, Cal. The booklet is an instructive exposition of the process and contains reprints from the various engineering and mining papers which have commented upon it.

Pumping Machinery.—Steam and power pumping machinery is described in catalogue 48, edition C, from Fairbanks, Morse & Co., 133 Liberty street, New York City. The catalogue opens with a bit of instructive matter, including directions for setting up and running pumps, and an explanation of the construction and action of the Fairbanks-Morse duplex pumps. The line illustrated in the pages which follow includes boiler feed, outside center packed, plunger and ring pattern pumps, low service or tank pumps, low steam pressure, vertical, automatic receiver, fire and compound pumps, pumping engines, plunger, hydraulic pressure and mine pumps, vacuum and condenser pumps, well pumps and power pumps. Diagrams of the various parts are referred to by name and number, and more useful information in the way of tables, &c., concludes the book.

Planers.—A new catalogue from the G. A. Gray Company, Cincinnati, Ohio, is on the subject of planers and covers two distinct types which this concern manufacture, spur geared and spiral geared planers. The first are made in sizes 22 x 22 inch to 84 x 56 inch, and the second in 30 x 30 inch to 96 x 72 inch. They are furnished with any length of bed, single or double heads on the rails and side heads on either one or both housings. Electric motor drive may be applied to the spur geared planers by direct connection, silent chain, geared or belted drive, and on the spiral geared planers by self-contained or belted drive. Illustrations and descriptions are given for a number of standard sizes, showing each form in which a radical change appears. A description of widened planers is also given, with a table of the amount of widening which may be applied to the several sizes of the two types. Illustrations are given of a special switch and frog planer and independent housings for use in connection with planers.

Blowers and Engines.—Catalogues Nos. 31 and 40 are being distributed by Wm. Bayley & Sons Company, Milwaukee, Wis. The first is devoted to a description of steel plate exhaust fans, planing mill and cotton exhausters, blowers, heaters, dry kilns, engines, ventilating apparatus, mechanical draft, and drying apparatus and appliances. It is illustrated with half-tones and outline drawings giving dimensions, and also contains a number of valuable tables. Catalogue No. 40 illustrates a line of generating sets consisting of vertical engines direct connected to generators of several different makes.

Conveying Machinery.—Booklet No. 6 has just been issued by the Borden & Selleck Company, Chicago, Ill. It describes conveying machinery and illustrates many interesting installations. The descriptive matter covers a wide range of conveyors for a variety of purposes, among them a motor driven continuous and single strand vertical conveyor for packages, a combined horizontal conveyor for freight, reversible trucking conveyor for warehouse and freight depots and docks, railway coaling stations coal and ash conveyors and Harrison conveyors. Space is also given to the Bray Patent disk roller screen, the Howe gasoline engines and the Morse silent high speed rocker joint chain. Working details of plants are given which will be of interest to engineers.

Pneumatic Hoists.—A catalogue from the Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill., describes a complete line of pneumatic motor hoists, cylinder hoists, trolleys, winding drums, foundry elevators, car jacks, jib cranes, &c., made by that company. The catalogue is well illustrated and contains a deal of matter that will be of value to those engaged in the installation of apparatus of the character which it describes.

The Iron and Metal Trades

The most interesting news of the week was the quarterly statement of the United States Steel Corporation issued on Tuesday, for which the trade had been looking with considerable anxiety. Conflicting reports have been in circulation relative to the earnings for the quarter, and some of these reports named such low figures that if they had proved to be correct the effect upon market sentiment would have been decidedly chilling. The announcement that the net earnings amounted to $13,208,886 was much better than had been expected, and notwithstanding the fact that the declaration of the regular dividend causes a deficit of $1,857,120 for the quarter, the effect cannot be other than encouraging. It is shown that the monthly earnings of March were more than double those of January, and each month may be expected to show still better results during the coming quarter. Another very satisfactory portion of the statement related to the unfilled orders on hand. These figures showed 4,136,961 tons on March 31, as compared with 3,215,123 tons on December 31, authoritatively confirming the reports relative to the general improvement in trade in progress since the dull times of December and January.

A fair condition of trade appears to be assured for a reasonable distance in the future. Pig Iron is firm despite the additions steadily being made to producing capacity. Philadelphia reports large orders for Structural Shapes, of which nearly 100,000 tons are said to have gone to the Steel Corporation. This is a line in which business has been lagging. The Bar trade is exceptionally strong. Western consumers have delayed specifying on their contracts too long, and many now want deliveries at the same time. Mills are, therefore, crowded with old work, while fresh contracts are coming in.

A number of important trade meetings are scheduled in this city about this time. The Steel Billet manufacturers are in session as we go to press. The Structural Shape and Plate associations will meet on Thursday. The Lake Superior Iron Ore interests will hold another conference on Tuesday of next week. It is not expected that any change will be made in prices of Billets, Structural Shapes or Plates, and the belief is growing that the Ore interests will be able to get together, possibly making a slight reduction.

An interesting situation, with possibilities of trouble in it, is presented by the recent vote of the union Sheet and Tin Plate mill men, which was overwhelmingly against accepting the 20 per cent. reduction in wages. The outcome will not be definitely known until the latter part of the week, after conferences are held between manufacturers and representatives of the Amalgamated Association. It looks at present as though the officers of the association may be able to prevail upon the men to accept the reduction.

LATER.—The Billet Association has reaffirmed the prices of Steel Billets and Sheet Bars.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Apr. 6, 1904.	Mar. 30, 1904.	Mar. 9, 1904.	Apr. 8, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$15.00**	$15.00	$14.75	$21.00
Foundry Pig No. 2, Southern, Cincinnati	**12.50**	12.50	12.00	20.25
Foundry Pig No. 2, Local, Chicago	**14.00**	14.00	13.25	22.50
Bessemer Pig, Pittsburgh	**14.35**	14.35	13.85	21.85
Gray Forge, Pittsburgh	13.25	13.25	13.25	20.50
Lake Superior Charcoal, Chicago	**15.25**	15.25	15.00	25.50
BILLETS, RAILS, &c.:				
Steel Billets, Pittsburgh	23.00	23.00	23.00	30.00
Steel Billets, Philadelphia	**25.50**	25.00	24.25	28.50
Steel Billets, Chicago	24.00	24.00	24.00	31.50
Wire Rods, Pittsburgh	31.00	31.00	31.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	11.50	11.50	11.50	18.50
O. Steel Rails, Philadelphia	**15.00**	15.00	14.00	21.50
O. Iron Rails, Chicago	16.50	16.50	16.50	24.50
O. Iron Rails, Philadelphia	**18.50**	18.50	15.00	25.00
O. Car Wheels, Chicago	*14.00*	14.50	14.50	24.00
O. Car Wheels, Philadelphia	**13.50**	13.50	13.00	24.50
Heavy Steel Scrap, Pittsburgh	14.00	14.00	14.00	21.50
Heavy Steel Scrap, Chicago	11.50	11.50	11.50	18.25
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	**1.48½**	1.48½	1.43½	1.93½
Common Iron Bars, Chicago	**1.50**	1.50	1.45	1.85
Common Iron Bars, Pittsburgh	**1.40**	1.40	1.34¾	1.85
Steel Bars, Tidewater	**1.49½**	1.49½	1.44½	1.75
Steel Bars, Pittsburgh	**1.35**	1.35	1.30	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.85
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.75
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	1.45	....	1.45	2.00
Skelp, Sheared Iron, Pittsburgh	1.52½	....	1.50	2.05
Sheets, No. 27, Pittsburgh	*2.15*	2.15	2.20	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.55	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.95	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.75	1.70	2.15
METALS:				
Copper, New York	**13.12½**	12.75	12.50	14.50
Spelter, St. Louis	**5.00**	4.95	4.80	5.40
Lead, New York	4.50	4.50	4.50	4.65
Lead, St. Louis	*4.42½*	4.42½	4.47½	4.57½
Tin, New York	**28.35**	28.35	28.00	29.25
Antimony, Hallett, New York	**7.25**	7.25	7.00	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.99

Chicago.

FISHER BUILDING, April 6, 1904.—(*By Telegraph.*)

We might almost change the date on last week's report and let it go as representing the condition of the market this week and the prevailing prices. It has been a quiet week in all lines, with just enough demand to maintain prices, and not enough to lead to any upward movement. Pig Iron is still being held very generally at last week's prices. All the leading Southern producers are consistently naming prices based on $10, Birmingham, for No. 2, but that there are minor factors in the market who are shading prices about 25c. per ton is pretty generally conceded. With furnaces selling more than they are producing and with stock piles gradually growing less, there is no likelihood of a general reduction in prices, and it is quite likely that whatever disturbing factors may be present in the market now will be eliminated shortly. Northern Iron is still being held at $14 at the furnace by one large producer, and $14 to $14.50, Chicago, by another. The week under review is marked by no large transactions, and buyers are disposed to hold off as long as possible, in the hope that the tide may turn in the other direction. There is a fair movement in Forging and Axle Billets at pool prices. Rails are extremely quiet, with some fair sized orders in Track Supplies, the tendency of many roads being to tide over the purchases of new Rails by equipping old ones with new fastenings. Light Rails are a little strong in tone for the ordinary car lot buyer, though any factor in the market for large tonnages can secure Rails at less than the cost of Billets. There has been but little business in Structurals. Plates are extremely quiet. Sheets are stronger in tone, with certain disturbing factors brought into line. Heavy business is being done in Bars; not so much new business as liberal specifications on the part of

implement manufacturers, wagon manufacturers and, to some extent, from car builders. The same may be said about Agricultural Steel. The Pipe business is heavy, with mills confronted by an alarming scarcity in Skelp and great difficulty in getting sufficient cars to move their products. Boiler Tubes share the stagnation of Plates. Old Materials are weak, with a decided downward tendency. Coke is comparatively strong, at $2.25 to $2.50 at the ovens for strictly 72-hour Connellsville grades.

Pig Iron.—The prices and conditions of last week prevail without exception. Southern Iron is being held by all the leading producers at $10, Birmingham, for No. 2, and there is not likely to be a reduction in prices as long as the furnaces are shipping more than they are making. Some Iron is being offered in the Chicago market at about 25c. less than this price from furnaces that have a freight advance amounting to the difference. The bargain freight rate north of the Ohio River of $1.25, reduced from $1.60, which went into force March 19, is now history, and the old $1.60 price is restored. However, there has been an extension of time, which will give shippers the benefit of delays in transferring freight south of the Ohio River, due to the floods. In adjudicating freight rates the shipper will be allowed an extension of ten days to cover delays of this character, and still be given the $1.25 rate north of the river. Northern Irons are being held firmly at $14 to $14.50, Chicago, one producer making a flat price of $14 at the furnace, and the largest competing interest naming $14 to $14.50, Chicago, as their range of prices. These two prices are practically the same, as the cost of delivering from furnaces to consumers' tracks in Chicago will vary from 25c. to 50c. It is reported here that stocks of Charcoal Iron are being reduced in a manner satisfactory to the Lake Superior producers, but that this was done by some of the Charcoal Iron producers at a great sacrifice of profit. Prices prevailing in this market are as follows:

Lake Superior Charcoal	$15.25 to $15.75
Northern Coke Foundry, No. 1	14.50 to 15.00
Northern Coke Foundry, No. 2	14.00 to 14.50
Northern Coke Foundry, No. 3	13.50 to 14.00
Northern Scotch, No. 1	14.75 to 15.25
Ohio Strong Softeners, No. 1	15.30 to 15.80
Ohio Strong Softeners, No. 2	14.80 to 15.30
Southern Silvery, according to Silicon	14.85 to 15.85
Southern Coke, No. 1	.... to 14.35
Southern Coke, No. 2	.... to 13.85
Southern Coke, No. 3	.... to 13.35
Southern Coke, No. 4	.... to 12.85
Southern Coke, No. 1 Soft	.... to 13.85
Southern Coke, No. 2 Soft	.... to 13.35
Southern Gray Forge	.... to 12.60
Southern Mottled	.... to 12.35
Malleable Bessemer	14.00 to 14.50
Standard Bessemer	15.80 to 16.30
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon	16.80 to 18.30
Alabama Basic	.... to 13.85
Virginia Basic	14.60 to 14.85

Billets.—There seems to be a lively war on between a new forging company, whose plant has just been completed at Indiana Harbor, and old concerns. The latter claim that the newcomers are disturbing the market by quoting unnecessarily low prices. The fact of the matter is that the Forging business is extremely dull. This is due largely to the stagnation in construction work in railroad and marine interests. It is reflected in a light demand for Forging Billets in large tonnages. In other words, firms that ordinarily contracted for thousands of tons now buy piecemeal in much less quantities. The jobbing Forge shops, on the other hand, are fairly active, and Skein and Axle makers seem to be extremely busy, leading to a heavy demand for such Billets as they employ. Association prices rule—namely, $24 for Forging Billets, 4 x 4 and larger, with $1 extra for Axle Billets and Billets smaller than 4 x 4.

Rails and Track Supplies.—There seems to be almost nothing doing in Standard Section Rails, and only a fair business in Light Rails, 36 lbs. to the yard and lighter. Standard Section Rails continue to be sold at the pool price of $28 per ton for 500-ton lots and greater, and $30 per ton in single car lots, while Light Rails have strengthened somewhat and are now being sold at from $25 to $27 per ton at Chicago. A large inquiry for Light Rails would develop prices very much lower than these, however. Track Supplies are a little more active than Rails, as many roads are adopting the expedient of patching up their trackage rather than replacing it. Angle Bars are still quoted 1.40c. to 1.50c., Spikes at 1.70c. to 1.80c., base, while Track Bolts have been reduced to 2.30c. to 2.35c., base, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts.

Structural Materials.—This has been a quiet week, with nothing doing in large tonnages and only a fair volume in the aggregate of small orders. Prices from mill are unchanged, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, $1 per ton extra. Store prices on Structurals as advanced are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—Plates are extremely weak in demand, owing to the fact that Steel car builders, the largest users, are idle; shipyards, who rank next, are in a state of stagnation, and boiler shops, who would rank third in the tonnage of Plates, are averaging only about half their ordinary output. We quote, carload lots, from mill, f.o.b. Chicago: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange Steel, 1.86½c.; Marine, 1.96½.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 inch Tank, 1.86½c.; Nos. 7 and 8, 1.91½c.; No. 9, 2.01½c.; No. 10, 1.91½c. to 1.96½.; No. 11, 1.96½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. From store Plates are selling at 2c. for Tank quality, ¼-inch and heavier; 2.10c. for 3-16; 2.15c. for No. 8; 2.20c. for No. 10, with 25c. per 100 lbs. for Flange quality.

Sheets.—It has transpired that some very vigorous price cutting was done last week by certain independent interests, that for reasons best known to themselves made prices $3 and $4 per ton lower than the association figures on heavier gauges of Sheets, and $2 and $3 lower on light gauges. Influence has been brought to bear on these disturbing factors, with the result that the market is considerably stronger this week. The following are the association prices, which may be taken as representing the average car lot quotation, though inquiries for tonnages of any moment will develop prices from $1 to $2 per ton lower: Nos. 9 and 10, 2.01½c.; Nos. 11 and 12, 2.06½c.; Nos. 13 and 14, 2.11½c.; Nos. 15 to 17, 2.16½c.; Nos. 18 to 21, 2.21½c.; Nos. 22 to 24, 2.26½c.; Nos. 25 and 26, 2.31½c.; No. 27, 2.36½c.; No. 28, 2.46½c.; No. 29, 2.56½c.; No. 30, 2.71½c. Prices from store remain unchanged, notwithstanding the higher mill prices, and are quoted as follows: Nos. 8 and 10, 2.15c. to 2.20c.; No. 12, 2.20c. to 2.25c.; No. 14, 2.30c. to 2.35c.; No. 16, 2.40c. to 2.45c.; Nos. 18 and 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.55c. to 2.60c.; No. 26, 2.65c. to 2.70c.; No. 27, 2.75c. to 2.80c.; No. 28, 2.80c. to 2.85c.; No. 29, 2.95c. to 3c.; No. 30, 3.10c. to 3.15c. Galvanized Sheets share in the strength of Black Sheets, and there is less cutting below the prices quoted by the leading producer than there has been. The prices of the leading producer average about 80 and 3 discount from list, in car lots, at Pittsburgh. Store prices on Galvanized Sheets remain unchanged at 75 and 7½ to 75 and 10 per cent. discount.

Bars.—Implement manufacturers and other large Bar users are now coming to a realization of the fact that they delayed specifying on contracts too late. The condition that the mills warned them of is now present. Buyers all want their Bars at the same time. The result is that mills are besieged with letters pleading for quick shipment of Bars that were ordered only recently, and, though doing their best, they are not able to meet the demand. Not a very great tonnage of new business is being placed at the 1.35c. price, although a sufficient number of orders is being booked to satisfy the mills that the trade understands that that is the price, and not a fraction less. Iron Bars are fairly firm at 1.50c., Chicago, in car lots, though here and there one hears of large transactions at slightly below this figure. Steel Bars are held absolutely on the basis of 1.35c., Pittsburgh, or 1.51½c., base, half extras, Chicago, in car lots, with 5c. extra for less than car lots and the usual quantity extras. Iron Bars are held quite firmly at 1.50c. in car lots and 1.55c. in less than car lots, Chicago. Hoop prices are not at all consistent with Band prices. For instance, a No. 14 Hoop is now sold at 1.50c., Pittsburgh, and a No. 12 Band, quite a good deal heavier, is held absolutely at 1.65c., Pittsburgh; and, again, a 1½ x 3-16 Bar or Band is held at 1.55c., Pittsburgh, while a 1½ x No. 14 Hoop is sold at 1.50c. The prices just named are arrived at by adding net extras to the base price. It is argued from these inconsistencies that Hoops must be advanced in price Store prices on Bars are as follows: Iron Bars, 1.75c., base, full extras; Steel Bars, 1.70c. to 1.80c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—What we said about Bars applies equally to Merchant Steel. Implement manufacturers are finding difficulty in securing shipment of their specifications as early as they would wish, and some are seriously crippled by the fact that mills inundated with a flood of specifications are unable to make shipments of the special sections required with the same degree of promptness that they would have shipped 30 days ago. Quotations are as follows, in car lots, Chicago: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; Special Tool Steel, 13c. up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—Pipe mills are all busy, though they are experiencing difficulty in securing Skelp. The shortage of Skelp is due to a variety of causes, chief of which is the congestion of the Skelp mills, owing to extraordinarily heavy business. Matters are made worse by recent floods and by the abominable service given by the carrying roads. Discounts are as follows in car lots from mill, f.o.b. Chicago:

	Steel Pipe. Black. Per cent.	Steel Pipe. Galv. Per cent.	Guar. Wr'ght Iron. Black. Per cent.	Guar. Wr'ght Iron. Galv. Per cent.
⅛ to ⅜ inch	66.35	56.35	64.35	54.35
½ inch	69.35	59.35	67.35	57.35
¾ to 6 inches	73.35	63.35	71.35	61.35
7 to 12 inches	69.35	59.35	66.35	56.35

Less than carloads, 12½ per cent. advance.

Boiler Tubes.—Business is still very dull, though prices are not being cut to any alarming extent. Ruling discounts are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	43.35	40.80	53.35
1¾ to 2¼ inches	55.85	38.35	40.35
2½ inches	58.35	43.35	40.35
2¾ to 5 inches	64.35	50.85	up to 4 in. 48.35
6 to 13 inches	55.85	38.35	....

Store discounts on Boiler Tubes remain nominally at least as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches	40	35	37½
1¾ to 2½ inches	50	32½	35
2¾ to 5 inches	60	45	45
6 inches and larger	50	32½	.

Cast Iron Pipe.—This market is very strong, and the tendency of prices is upward. A number of contracts are still being figured on in the Southwest, particularly three for Oklahoma Territory, aggregating about 2500 tons. Prices are still held at the following figures: 4-inch Water Pipe, $26; 6 to 12 inch, $25; larger than 12-inch, $24, with $1 per ton extra for Gas Pipe.

Old Material.—This is a weak market for Old Matarials, with the supply greatly in excess of the demand and a decided downward tendency in prices. This tendency, however, has not crystallized sufficiently to warrant us in naming new prices on any except Old Car Wheels, Iron and Steel Axle Turnings, Heavy Cast Scrap and Stove Plate and Light Cast Scrap, all of which we reduce 50c. per ton. The following lists, among others, are now being offered by Western roads: Wisconsin Central, about 200 tons; Chicago, Milwaukee & St. Paul, about 1500 tons; Rock Island, about 800 tons; the 'Frisco, about 800 tons. We quote as follows, per gross ton, Chicago:

Old Iron Rails	$16.50 to $17.00
Old Steel Rails, 4 feet and over	13.00 to 13.50
Old Steel Rails, less than 4 feet	11.50 to 12.00
Heavy Relaying Rails, subject to inspection	23.00 to 24.00
Heavy Relaying Rails, for side tracks	18.00 to 20.00
Old Car Wheels	14.00 to 14.25
Heavy Melting Steel Scrap	11.50 to 12.00
Mixed Steel	9.50 to 10.50

The following quotations are per net ton:

Iron Fish Plates	$13.50 to $14.00
Iron Car Axles	17.00 to 17.25
Steel Car Axles	14.50 to 15.00
No. 1 Railroad Wrought	12.50 to 13.00
No. 2 Railroad Wrought	11.50 to 11.75
Shafting	13.50 to 14.00
No. 1 Dealers' Forge	10.00 to 10.50
Wrought Pipe and Flues	8.50 to 9.00
Iron Axle Turnings	8.25 to 8.50
Soft Steel Axle Turnings	8.25 to 8.50
Machine Shop Turnings	7.25 to 7.50
Cast Borings	4.75 to 5.00
Mixed Borings, &c.	4.75 to 5.00
No. 1 Mill	7.50 to 7.75
Country Sheet	7.00 to 7.25
No. 1 Boilers, cut in Sheets and Rings	9.00 to 9.50
Heavy Cast Scrap	11.50 to 12.00
Stove Plate and Light Cast Scrap	9.00 to 9.50
Railroad Malleable	10.00 to 10.50
Agricultural Malleable	9.50 to 10.00

Metals.—Copper has remained steady at 13c. for Casting and about ¼c. more for Lake, in car lots. Pig Tin is unchanged at 29½c., with spot sales at about 29¾c. Pig Lead is firm at 4.45c. in 50-ton lots, 4.55c. in car lots, 4.85c. in ton lots or less. Spelter is slightly stronger, now being quoted at 5⅛c. Sheet Zinc remains at 5.75c. per lb. in car lots of 600-lb. casks and 5.95c. to 6c. for less than car lots. Old Metals are unchanged, as follows: Copper Wire and Heavy, 11⅝c.; Copper Bottoms, 10⅝c.; Copper Clips, 10¾c.; Red Brass, 10½c.; Red Brass Borings, 8¼c.; Yellow Brass, Heavy, 8½c.; Yellow Brass Borings, 6¼c.; Light Brass, 6c.; Heavy Lead, 4.25c.; Tea Lead 4.10c.; Zinc, 3⅝c.; Block Tin Pipe, 24c.; Pewter, No. 1, 19c.

Coke.—It appears that there is a little relief in the strained car situation, and railroads are beginning to catch up with the accumulation of undelivered Coke freight. Prices on Coke remain as before, $2.25 to $2.50, Connellsville region, for strictly 72-hour Foundry Coke. More business is being done at $2.25 than at a higher figure, though there is a considerable volume of choice grades moving at $2.35 and some special grades as high as $2.50. To get the Chicago price add $2.65 per ton for freight to the figures just given.

While it is not our custom to print lists of tenants of office buildings, so many firms prominent in the Iron and Steel trade have removed from the Rookery, the Monadnock, the Marquette, the Fisher and others to the new Railway Exchange Building in Chicago that it may be a matter of convenience to our readers to consult the list which follows, the addresses after most of the names indicating the building from which the firms are removing:

Chas. G. Gates, Rookery.
National Malleable Castings Company.
Featherstone Foundry & Machine Company.
Kennicott Water Softener Company, 77 E. Jackson Boulevard.
Rodger Ballast Car Company, 281 Dearborn street.
Erie Railroad Company, 138 E. Jackson Boulevard.
Chicago & Alton Railway Company, Grand Central Depot.
Atchison, Topeka & Santa Fe Railway Company, 77 E. Jackson boulevard.
Chicago, Milwaukee & St. Paul Railway Company, Old Colony Building.
Lehigh Valley Railway Company.
Henry E. Weaver Coal & Coke Company.
Standard Forgings Company.
U. S. Engineering & Contracting Company.
Chicago Car Heating Company, Monadnock Block.
Hoover & Mason, Old Colony Building.
Thompson-Starrett Company, Tribune Building.
Buda Foundry & Mfg. Company, Monadnock Block.
F. M. Pease Car Company, Monadnock Block.
Copper Cliff Mining Company, 79 Dearborn street.
Otis Elevator Company, 159 La Salle street.
United Supply & Mfg. Company, Fisher Building.
Westinghouse Air Brake Company, Rookery.
Sullivan Machinery Company, 135 Adams street.
American Car & Foundry Company, 281 Dearborn street.
Sherwin-Williams Company.
Joseph Joseph & Bros. Company, 77 E. Jackson boulevard.
Municipal Engineering & Contracting Company, 315 Dearborn street.
James T. Gardner, Great Northern Building.
Julian L. Yale & Co., Monadnock Block.
Baldwin Locomotive Works, Monadnock Block.
Inland Coal & Coke Company, Tribune Building.
Ward Railway Supply Company.
Anaconda Copper Mining Company, 59 Clark street.
U. S. Metal Mfg. Company.
American Locomotive Equipment Company.
Sargent & Lundy, 46 Van Buren street.
Arnold Electric Power Station Company, Marquette Building.
United States Mica Mining & Milling Company, Fort Dearborn Building.
Chicago Edison Company, 139 Adams street.
Western Passenger Association, Monadnock Block.
Peerless Rubber Company, Old Colony Building.
Northwestern Terra Cotta Company, Clyborn and Wrightwood avenues.
R. M. Burns, Fisher Building.
H. C. Cooper, 277 Dearborn street.

The Railway Exchange Building is on the northwest corner of Jackson boulevard and Michigan avenue.

The Fort Wayne Iron & Steel Company, Fort Wayne, Ind., manufacturers of Bar Iron, have opened a sales and purchasing department in room 407 the Temple, Chicago, for the convenience of their customers and the trade generally in Chicago and the immediate vicinity. The Chicago sales department is in charge of P. H. Joyce and the purchasing department in charge of L. Burnstein.

Philadelphia.

FORREST BUILDING, April 5, 1904.

The past week was somewhat interrupted by the Easter festivities, so that general conditions are practically unchanged. The volume of business is fairly satisfactory, in some lines being rather heavy, and in others not up to expectations, although the average indicates better conditions than seemed probable two or three months ago. As a rule, it may be said that a good business during the second quarter of the year is reasonably well assured, but beyond that there is a good deal of uncertainty, so that purchases that involve deliveries later than June or July will be somewhat restricted until the outlook becomes somewhat clearer. The trade situation is not such as to make the outlook very hopeful. The textile interests, which are of great magnitude in this vicinity, are in extremely bad shape, and as will be seen from our machinery report, the tendency in that branch is not toward improvement. The Eastern districts are not the whole show, however, and if the West and South can maintain activity the current output of Pig Iron may be taken without affecting prices unfavorably. Other reasons might be given to discourage extreme optimism, but consideration of these may be postponed until they begin to develop, and in the meanwhile "sufficient for the day is the evil thereof."

Pig Iron.—There has been no change of any moment in the market for Pig Iron during the past week. Prices are firm, but the demand is not particularly urgent, the only exception being Basic Iron for April shipment. Mill Irons are not plentiful, however, and a continuance of demand such

as was met with during the latter portion of March would probably lead to increased strength in these grades, but the opinion appears to be that the scarcity will be very prolonged; meanwhile $14 would be an inside figure for Basic Iron, deliverable during the third quarter, with a slight premium for April and May shipments. Mill Irons are relatively scarcer than foundry grades, and $13.50 would be a very inside figure, while $13.75 to $14 are firm quotations for favorite brands. Foundry Irons can be had at $15 to $15.25 for No. 2 X, although $15.50 is asked for some brands, and are firmly held at that figure, although, of course, a good deal depends on how much Iron the furnace may have unsold. Southern brands are held at $10, Birmingham, for No. 2, and for the present it is not likely that better could be done, although buying at that figure is not on a very large scale. There appears to be a general feeling that prices now ruling will be maintained during the next two or three months; some talk of a further advance, but the market would certainly not stand it at the present time. The furnace report of next week will probably have considerable influence on the situation. If stocks are reduced it will give substantial support to those who favor higher prices, and *vice versa*. Without any advance information in regard to what the report will show, it is believed that while 320,000 tons per week may be none too much for the ensuing three months, yet it may be too much for the three months following, and it will be too much unless something occurs to create a larger demand than is in sight at the present time. Imports of Pig Iron are being made from Canada by some of the Pipe founders, but as the product is for export, it has no special bearing on the domestic trade. Quotations for Philadelphia and nearby deliveries are about as follows:

No. 1 X Foundry	$15.75 to $16.00
No. 2 X Foundry	15.00 to 15.25
No. 2 Plain	14.50 to 14.75
Southern No. 2, rail shipment	14.25 to 14.50
Southern No. 2, on dock	13.75 to 14.00
Standard Gray Forge	13.75 to 14.00
Ordinary Gray Forge	13.00 to 13.25
Basic	14.00 to 14.10

Steel.—There is an active demand for Steel, and April and May shipments would command $25.50, delivered. Small lots are quoted at higher figures, and $25.50 to $26 would be about the range, price according to quantity, date for delivery, &c.

Plates.—Business is not essentially different to what it has been for several weeks past, but prospects appear to be considerably better. Some large orders have been placed which in the near future will involve a heavy tonnage of Plates, so that mills are fairly well assured of full employment during the spring and summer months. Prices unchanged, as follows:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼ inch and heavier	1.73½	1.78½
Tank Steel, 3-16 inch	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.	1.98½	2.03½
Flange or Boiler Steel	1.83½	1.88½
Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
Plates over 100 to 110 inches	.05 per lb.	extra
Plates over 110 to 115 inches	.10	"
Plates over 115 to 120 inches	.15	"
Plates over 120 to 125 inches	.25	"
Plates over 125 to 130 inches	.50	"
Plates over 130 inches	1.00	"
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10	"
Complete Circles	.20	"

Shell grade of Steel abandoned.

Structural Material.—Large orders have been placed during the past week, and it is said that nearly 100,000 tons go to the United States Steel Corporation. The Wanamaker Building will require 24,000 tons, besides which a good deal of bridge work is in prospect. The smaller class of trade are also good buyers, so that the feeling in this department is extremely hopeful. Prices unchanged, as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specification, and small Angles, 1.50c. to 1.55c.

Bars.—A strong and active demand is reported from the Bar trade, and mills are better employed than they have been at any time since last summer. Prices are firm and unchanged at 1.48½c. to 1.55c. for both Iron and Steel Bars.

Sheets.—The demand is not specially active, but mills are busy and get day to day orders that are fully equal to deliveries. Prices a little easier, but not quotably lower.

Old Material.—There is a strong undertone, and, while some irregularity in prices is met with, the general trend is to higher figures. Sales have been made at about $16 for Choice Steel Scrap, and $15.50 appears to be a very inside figure. Bids and offers are about as follows for deliveries in buyers' yards:

No. 1 Steel Scrap	$15.00 to $16.00
Low Phosphorus Scrap, nominal	18.00 to 18.50
Old Steel Axles	18.00 to 19.00
Old Iron Rails	18.50 to 19.00
Relaying Rails	21.00 to 22.00
Old Iron Axles	22.00 to 22.40
Old Car Wheels	13.50 to 14.00
Choice Scrap, R. R., No. 1 Wrought	18.00 to 18.50
Country Scrap	16.50 to 17.00
Machinery Scrap	13.50 to 14.00
No. 2 Light Scrap	12.50 to 13.00
No. 2 Light (Ordinary)	10.50 to 11.00
Wrought Turnings	10.00 to 10.25
Wrought Turnings, Choice Heavy	10.50 to 11.00
Cast Borings	7.75 to 8.25
Stove Plate	12.50 to 12.75
Wrought Iron Pipe	13.00 to 13.50

Cleveland.

CLEVELAND, OHIO, April 5, 1904.

Iron Ore.—At the meeting of the Ore Association scheduled for New York in a few days it is proposed the whole question of Ore rates for the coming season shall be brought up and decided. Lately a different situation has presented itself in the Ore field, which changes the whole aspect of things. All spring the vessel interests have been talking of a short season of navigation. It was assumed all along that they were merely talking to bolster up their hope of a better rate for carrying Ore down the lakes. Now the short season seems absolutely established beyond question. The winter has been unusually severe and the spring has been backward. This time last year the boats were passing the Soo, but now the channels between the upper lakes are as tightly frozen as they usually are in the middle of winter, and the first cargoes of Ore may be delayed until about the first or the middle of May in reaching the lower lake ports. Meanwhile the increase in consumption promises a better market. No sales of Ore have been reported, all producers holding off until the price question is settled.

Pig Iron.—The first few days of April have seen unusually heavy buying orders in Foundry Pig Iron. Some of the furnaces are willing to take contracts for second half delivery, but most are not. They are waiting for the action of the Ore Association, preferring not to make second half contracts in the dark. For spot delivery it is realized that Iron is getting scarce. Some of the furnaces still have Iron to sell for delivery up to July 1, but a majority have nothing before July 1. This is the result of the furious buying movement of the past few weeks. There is a good inquiry for Bessemer, but it has not brought out any orders as yet. The price generally asked is $13.50 in the Valleys. No definite trading has been reported in Basic, but it is known that inquiries are very sharp, and that the supply is under the demand. The price holds at $13.50 in the Valleys. The Coke situation is a little easier and the market is inclined to soften, but has not weakened. This is the result of the change in the railroad situation, cars being in better supply. Good 72-hour Furnace Coke brings between $2.25 and $2.50 at the oven, and Furnace Coke is bringing $1.75 at the oven. We quote for Pig Iron, f.o.b. cars Cleveland:

Northern Coke, No. 1 Foundry	$14.00 to $14.25
Northern Coke, No. 2 Foundry	13.50 to 14.00
Northern Coke, No. 3 Foundry	13.00 to 13.25
Southern Coke, No. 1 Foundry	14.35 to 14.60
Southern Coke, No. 2 Foundry	13.85 to 14.10
Southern Coke, No. 1 Soft	14.35 to 14.60
Southern Coke, No. 2 Soft	13.85 to 14.10
Jackson County, 8 per cent. Silicon	16.50 to 17.00
Hanging Rock Charcoal, No. 1	.... to 23.45
Southern Charcoal, No. 1	19.50 to 20.00
Lake Superior Charcoal	16.50 to 17.00

Finished Iron and Steel.—The only development has been the selling of some railroad material, principally Rails. These supplies have gone to traction companies, the steam railroads not making their purchases through this territory. It is understood that more good traction Rail sales are pending in this territory, but they depend upon the financing of the undertakings, and this is still a matter of the future. The call for Light Rails has been steady, and inclines to improve with the better state of affairs in the industrial world generally. Prices quoted are $28, Pittsburgh, for Standard Rails, and $24 to $25, Pittsburgh, for Light Rails. The buying of Structural seems to be a little better, but it is evident that the railroads have not yet started to cover their bridge contracts, many of them holding back their orders. This leaves the trade dependent upon the building industry here, and this is not very brisk this spring. In Plates the situation has not changed, many of the conditions which apply in Structural holding in this industry as well. The buying of Sheets has been a little better, but has not improved radically. The market is a little stiffer, but is still not overly buoyant. The smaller producers are not inclined to cut prices to get business. The market holds at 2.50c. for No. 27 Black Sheets, out of stock; 2.25c. to 2.30c. for One Pass Cold Rolled, in car lots, at mill, with No. 27 as the basis; 75, 10 and 5 off list for Nos. 16 to 20, and for No. 22 and lighter, 75, 10 and 7½ off list. The buying of Bars has improved over last week, when the report was also good. The demand for Bars, Hoops and Bands is the feature of the trading. Bar Steel stands at 1.35c., Pittsburg, for Bessemer, and 1.40c. for Open Hearth. Bar Iron

is maintained at 1.35c., Pittsburgh. There has been fair but not brisk buying of Billets, with the price $23.50, Cleveland, for Bessemer 4 x 4.

Old Material.—The demand has slightly improved and prices incline to be stiff, although it can hardly be said that they have an upward tendency. In fact, the reverse is true of Steel, on which prices have been sinking slightly. We revise and quote all gross tons: Old Steel Rails, $13.50 to $14.50; Old Car Wheels, $13 to $14; Heavy Melting Steel, $13 to $14. All net tons: Cast Borings, $5 to $5.75; No. 1 Railroad Wrought, $12.50 to $13; No. 1 Busheling Scrap, $11.50 to $12.50; Wrought Turnings, $7.50 to $8; Iron Car Axles, $18; No. 1 Cast Scrap, $11.50 to $12; Stove Plate, $9.50 to $10.50.

Cincinnati.

FIFTH AND MAIN STS., April 6, 1904.—(*By Telegraph.*)

Pig Iron.—The past week has been one that may be characterized as exceedingly quiet. There have been a number of small transactions, but the only one of any note was 1000 tons of No. 4 to a Pipe company, said to have been sold at $8.90, Birmingham. There has been an apparent lull visible in the market, and the buying movement so much in evidence a week or two ago has subsided to a great extent. This state of affairs is causing no uneasiness, as it is generally conceded to be more in the nature of an exhibition of strength than anything else, and it would not be a surprise at any time to learn that the Southern furnaces had advanced prices. These furnaces are practically sold up to July 1 and do not appear anxious to contract for later in the year. Northern furnacemen seem perfectly willing to sell for the last half, but in doing so insist upon higher prices. There are some small lots of No. 2 that are in the market for $9.75, Birmingham, but most agents are holding firm at $10. Mill Irons are reported as being in better demand than Foundry grades, with a scarcity of Gray Forge in the market. Freight rates from Hanging Rock district to Cincinnati, $1.15, and from Birmingham, $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$13.00 to $13.25
Southern Coke, No. 2	12.50 to 12.75
Southern Coke, No. 3	12.00 to 12.25
Southern Coke, No. 4	11.50 to 11.75
Southern Coke, No. 1 Soft	13.00 to 13.25
Southern Coke, No. 2 Soft	12.50 to 12.75
Southern Coke, Gray Forge	11.50 to 11.75
Southern Coke, Mottled	11.25 to 11.50
Ohio Silvery, No. 1	16.15 to 16.40
Lake Superior Coke, No. 1	14.15 to 14.40
Lake Superior Coke, No. 2	13.65 to 13.90
Lake Superior Coke, No. 3	13.15 to 13.40

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$17.00 to $17.50
Lake Superior Car Wheel and Malleable	17.00 to 17.50

Coke.—The Coke market has eased up considerably within the past week, probably due to the increased transportation facilities as well as the reduction in the price of Coal. Prices have moved a grade lower and demand is light. We quote, f.o.b. ovens: West Virginia Coke, $2 to $2.25; Connellsville, $2.25 to $2.40.

Plates and Bars.—This market shows increased activity and dealers are very much encouraged with the outlook. Quite a number of sales have been made and the demand is increasing. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—The true upward tendency for this class of material is shown by the fact that the mills are becoming buyers to a limited extent. Cast Scrap is in special demand and the price has advanced 25c. per ton. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $11 to $11.50 per net ton; No. 1 Cast Scrap, $10.25 per net ton; Iron Rails, $14.50 per gross ton; Steel Rails, rolling mill lengths, $11 to $11.50 per gross ton; Iron Axles, $15 per net ton; Car Wheels, $11 to $11.50 per gross ton; Heavy Melting Scrap, $11.50 per gross ton; Low Phosphorus Scrap, $11.50 to $12 per gross ton.

The Consolidated Lake Superior Company, having furnished a ten days' topic of animated discussion for New York's financial community, now becomes a vital issue in the Canadian Parliament, in which a bill for a Government loan is pending. Last Monday night there was an all night session because three Government supporters representing the majority had not returned after Sunday, and it became necessary to prolong the debate until a vote would not mean certain defeat. Meanwhile the Philadelphia stockholders of the company and the other interests are waiting.

New York.

NEW YORK, April 6, 1904.

Pig Iron.—The market is firmer, with a moderate amount of inquiry. Some of the Northern stacks tributary to this market are likely to blow out soon for repairs, while Southern makers are holding firm at $10 for No. 2 Foundry, Birmingham. The largest transaction in this district was the sale of between 2500 and 3000 tons of Basic Pig to a local Steel works. In the Schuylkill Valley two lots aggregating about 7000 tons were sold, and $14, delivered, is now firmly held with an upward tendency. We quote Northern No. 1, $15.50 to $16; No. 2 X Foundry, $15 to $15.50; No. 2 Plain, $14.50 to $14.75, and Gray Forge, $13.75 to $14.25. Tennessee and Alabama brands are quoted $13.75 to $14 for No. 2 Foundry and $13.25 to $13.50 for No. 3 Foundry.

Steel Rails.—The market is very quiet. It is understood, however, that considerable tonnage is still to come out. The New England roads have bought practically nothing thus far, while other lines tributary to the Eastern mills need additional quantities of Steel Rails, in spite of the cutting down by boards of directors of the requirements called for by the departments of way.

Cast Iron Pipe.—Nothing of special interest has developed during the week. The manufacturers continue to receive numerous small orders, and the current of trade is therefore as satisfactory as previously reported, but no tonnage of importance is in sight at the moment. Manufacturers are quoting carload lots at $28 per gross ton for 6 to 10 inch and $27 for 12-inch upward, at tidewater. Large lots are subject to special prices depending upon conditions.

Finished Iron and Steel.—The American Bridge Company, on closing their books for March, found that the month had been quite fair, considering prevailing conditions. The contracts closed aggregated about 25,000 tons. No new work of any magnitude was secured during the past week, but operations are now about to begin on the new Wanamaker store in Philadelphia, the contract for which was closed last year. The outlook for Structural work in this immediate locality continues uncertain, on account of labor troubles. The wearisome contest has several times appeared to be on the eve of settlement, but drags along discouragingly. It is still early enough for an active building season if an agreement could be reached and contractors could feel reasonably certain of being able to complete a piece of work undertaken. Everybody interested is earnestly hoping for an early termination of the controversy. The local Plate trade is quiet. Inquiries are light. Some low prices are being named on Universal Plates by Western mills. Bars continue quite active, with buyers still pressing for more rapid delivery. We quote, at tidewater, as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Common Bar Iron, 1.35c. to 1.40c.; Refined Bars and Soft Steel Bars, 1.49½c.

Old Material.—The situation presents some interesting features. Long Length Steel Rails for rerolling have been in strong demand and the available supply has been greatly reduced. It is stated that a leading railroad company which some time since had a very large quantity of such Rails on hand, for which they refused offers except much above the market, have been able to dispose of the entire stock and will hereafter have only the usual monthly accumulation. As an instance of the high prices which must be paid for selected material of this character, owing to its diminished supply, a small lot sold for construction purposes last week brought $23. The attention of consumers is being called to the fact that Rerolling Rails may be quite scarce this year, because so few new Rails are being bought, which indicates that renewals will be on a limited scale as compared with immediately preceding years. The general list of Old Material is very firm, with consumers purchasing direct as far as they can, thus making it difficult for dealers to participate in the trade. Prices are quoted as follows per gross ton, New York and vicinity:

Old Iron Rails	$17.50 to $18.50
Old Steel Rails, long lengths	16.00 to 16.50
Old Steel Rails, short pieces	12.50 to 13.00
Relaying Rails	18.00 to 19.00
Old Car Wheels	12.50 to 13.00
Old Iron Car Axles	18.50 to 19.00
Old Steel Car Axles	15.00 to 15.50
Heavy Melting Steel Scrap	12.50 to 13.00
No. 1 Railroad Wrought Iron	16.00 to 16.50
Iron Track Scrap	15.00 to 15.50
Wrought Pipe	11.50 to 12.00
Ordinary Light Iron	8.00 to 8.50
Cast Borings	6.00 to 6.50
Wrought Turnings	8.50 to 9.00
No. 1 Machinery Cast	12.50 to 13.00
Stove Plate	10.50 to 11.00

Pittsburgh.

PARK BUILDING, April 6, 1904.—(*By Telegraph.*)

Pig Iron.—While the Pig Iron market has been rather quiet, prices are very firm and the available Bessemer and Basic Iron for April shipment is pretty well cleaned up. Furnaces quote $13.50 for Bessemer for April and May delivery, and we note sales of 5000 tons at this price. The demand for Foundry Iron is quiet, but prices are firm on the basis of $13.15 to $13.25, Valley, equal to $14 to $14.10, Pittsburgh. Some of the Valley furnaces that formerly ran on Foundry are now making Bessemer Iron, and this has taken a good deal of Foundry Iron out of the market. Northern brands of Forge Iron are held at $13.25, Pittsburgh, but there is not much doing. There is a probability that the blast furnace workers in the Valley districts, and other places as well, will demand a restoration of the rate of wages that prevailed before the cut was made last fall, and which amounted to about 10 per cent.

Steel.—The Steel market is exceedingly active, and it is probable that the Sharon Works of the Carnegie Steel Company, which have been idle for some months, will be started at an early date. Billets and Sheet Bars for prompt delivery are scarce, and in several cases premums of 25c. to 50c. a ton have been paid for prompt shipment. We quote Bessemer and Open Hearth Billets at $23, Long Sheet Bars $24 and Sheet Bars cut to lengths $24.50, Pittsburgh, Wheeling or Youngstown delivery.

Ore.—From official sources we learn that there is every probability that the Ore Association will be renewed at the meeting of the Ore interests to be held in New York on April 12.

Skelp.—While the demand for Skelp is somewhat quiet, the mills have a good deal of tonnage on their books and are firm in their ideas as to prices. We quote Grooved and Sheared Steel Skelp at 1.35c. to 1.40c., Grooved Iron Skelp 1.45c. to 1.50c., and Sheared Iron Skelp 1.52½c. to 1.55c., all f.o.b. Pittsburgh.

(*By Mail.*)

It has finally been decided to hold a meeting of the Ore interests in New York on Tuesday, April 12, and much interest attaches to the meeting, as it will probably determine whether the Ore Association is to be renewed for this year or not. While there are some obstacles to overcome, it is believed the Ore agreement will be renewed for this year and prices fixed. These will doubtless be 50c. lower on Old Range Ores and 35c. on Mesaba. Interest also attaches to the meetings of the Plate and Beam associations, to be held in New York on Thursday, April 7, but it is not anticipated there will be any change in prices. As yet there is no official intimation as to whether the United States Steel Corporation will buy the 40,000 tons of Bessemer Iron for which they hold an option good until April 10 at $13, Valley furnace. The tonnage is small, representing less than two days' actual consumption of the Steel Corporation, and for this reason, and also for the fact that the purchase of this Iron would have a good general effect on the market, it is believed the Iron will be bought. The fact that Bessemer Iron has been selling freely of late at $13.50 at furnace, 50c. a ton higher than the Steel Corporation are to pay, may also have an influence in the matter.

The demand for Pig Iron for April and May delivery has been quite active of late, and a moderate tonnage of Bessemer and Basic Iron has been sold on the basis of $13.50 at Valley furnace. For May and June delivery it is probable that $13.25 at furnace could be done. Foundry Iron is fairly active on the basis of $13 to $13.25, Valley furnace, and Northern Forge Iron is held at about $13.25, Pittsburgh. The Steel market is very active, the mills being filled with orders, and prompt deliveries of both Billets and Sheet Bars are difficult to obtain. We are advised that in a number of cases recently premiums of 25c. to 50c. a ton have been paid for both Billets and Sheet Bars. In Finished Iron and Steel the situation is fairly good, the demand being quite active on all lines except Plates, which continue dull. Structural Steel has improved considerably recently, and some good sized contracts have been placed.

As anticipated in these columns last week, the vote of the lodges of the Amalgamated Association on the proposed 20 per cent. reduction in workmen's wages in Sheet and Tin Plate mills was overwhelmingly against the reduction. To-day a meeting of the Executive Board of the Amalgamated Association and delegates from the lodges of the different Sheet and Tin Plate plants is to be held in this city. On Thursday a conference is to be held between the Executive Board and officials of the American Sheet & Tin Plate Company, and on Friday a further conference will be held between the Executive Board and Sheet and Tin Plate mills. The various lodges were officially notified by wire by the Amalgamated Association to continue at work under the proposed reduction of 20 per cent. until to-day. The situation is interesting, and it looks as though the Amalgamated Association officials would attempt to compel the men to accept the reduction. It is certain that if a strike occurs the Amalgamated Association stands to lose a number of the Tin Plate and Sheet mills that now sign the scale.

Ferromanganese.—There is very little doing, and we quote domestic Ferro at $42 to $42.50, delivered.

Muck Bar.—Demand is fairly active, and best grades of domestic Muck Bar are held at $26.50, Pittsburgh.

Wire Rods.—There is a fair demand for Wire Rods, and we quote Bessemer and Open Hearth Rods at $31, Pittsburgh.

Steel Rails.—The market continues very quiet, and the report that the Lehigh Valley placed an order for 10,000 tons has been officially denied. Only small lots are being placed, the market being bare of large quantities.

Structural Material.—There are inquiries galore in the market, but they are very slow in developing into actual business. However, a very large tonnage has been placed in the past week. The American Bridge Company have now taken the material for the John Wanamaker building in Philadelphia, about 24,000 tons; the First National Bank building, at Warren, Pa., about 800 tons, and the Forest Park bridge at St. Louis, about 300 tons. It was supposed that the Wanamaker building had been placed some time ago, but the actual contract was only closed up recently. The Louisville & Nashville Railroad is in the market for a large amount of tonnage for bridges. The McClintic-Marshall Construction Company of this city have taken about 6500 tons of material for bridges and buildings in the past two weeks. There are a large number of other inquiries in the market, and the outlook is very much improved. The Diamond National Bank Building, to be erected in this city, will soon be ready for the bids. It will require from 6000 to 8000 tons. The Beam Association meets in New York on April 7, but it is not anticipated there will be any change in prices. Some low figures continue to be made for erection work. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—The amount of tonnage for Plates placed by the Steel car interests is very much smaller than generally supposed, and the Plate mills continue very short of work, owing to light demand. The Plate Association meets in New York on Thursday, April 7, but it is not believed there will be any change in prices. Consumers decline to make contracts ahead and are buying only in small lots. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers', 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, $2 extra; gauge Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—The demand for Sheets is reported to be quite active, and the mills have a good deal of tonnage on their books. There is much difficulty in getting prompt deliveries of Sheet Bars, and in some cases premiums over official prices have been paid for immediate shipment. We quote: No. 26 Black Sheets at 2.10c. to 2.15c.; No. 27, 2.15c. to 2.20c., and No. 28, 2.25c. to 2.30c., all f.o.b. at mill. The lower prices are available only on large lots. Galvanized Sheets are about 80 and 5 per cent. off, which is equal to 2.85c. for No. 26, 3.04c. for No. 27, and 3.23c. for No. 28. For small lots from store jobbers charge the usual advance over these prices.

Iron and Steel Bars.—We can note quite a number of contracts for Iron and Steel Bars placed recently by Agricultural Implement makers, and tonnage from this class of consumers is larger than for some time. The demand from the general trade is good, and the Bar mills are busy and have a good deal of tonnage on their books. We quote Iron Bars at 1.40c., Pittsburgh, and Steel Bars at 1.35c., Pittsburgh, in carloads and larger lots, with the usual differentials for less than carloads. On Open Hearth Bars $1 a ton advance is charged.

Hoops and Cotton Ties.—The Cotton Tie mills report a heavy tonnage placed for delivery this year. Prices remain on the basis of 80c. per bundle in 3000-bundle lots and 83c. per bundle in less quantities. Steel Hoops are held at 1.40c. and Steel Bands at 1.35c., extras as per Steel card.

Merchant Pipe.—The demand for tubular goods is not as active now as it was recently, but it is between seasons, when demand usually shows a falling off. The Pipe mills are quite busy and have a good deal of tonnage booked ahead. Discounts to consumers in carloads are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	66	56
½ inch	71	61	69	59
¾ to 6 inches	75	65	73	63
7 to 12 inches	71	61	68	58
Extra strong, plain ends, ¼ to 8 inches	67	57	64	54
Double extra strong, plain ends, ¼ to 8 inches	59	49	56	46

Boiler Tubes.—The market is fairly active, and the mills are well filled up for the next several months. Railroads are buying quite liberally, as well as the general trade. Discounts to consumers in carloads are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2¼ inches	55½	38
2½ inches	58	43
2¾ to 5 inches	64½	50½
6 to 13 inches	55½	38

Merchant Steel.—We note a great improvement in demand for Merchant Steel, and shipments from the leading mills last month were very much in excess of the two previous months combined. There has been an upward movement in prices, which are $1 a ton or more higher. We quote Hexagon Steel Bars, 1.60c. for Bessemer and 1.65c. for Open Hearth; Plow Steel, 6-inch and under, 1.40c. for Bessemer and 1.45c. for Open Hearth; Plow Slabs, ¼-inch and heavier, 1.65c.; Tire Steel, smooth finish, ¾ x 3-16 and larger, 1.65c. flat; Toe Calk, 1.90c.; Carriage Spring Steel, 1.75c. The demand for Shafting is quite heavy, and the mills have more tonnage on their books than for several months. We quote at 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Tin Plate.—The demand for Tin Plate is heavy, and all the mills have a large amount of business on their books. We quote 100-lb. Coke Ternes at $3.45 per box, f.o.b. Pittsburgh, with the usual slight differential to the large jobbing trade.

Spelter.—The demand for Spelter is quite active and prices are steady. We quote prime Western grades at 5.15c. to 5.17½c., f.o.b. Pittsburgh. We note sales in the past week of 175 to 200 tons of best grades of Western Spelter at 5.13½c. to 5.16c., delivered, Pittsburgh.

Iron and Steel Scrap.—The demand for Scrap is fairly active, but prices show no important changes. Heavy Melting Scrap is in good request, and prices are firm on the basis of $14 to $14.25, Pittsburgh. Old Steel Rails, short pieces, are held at $14 in gross tons; No. 1 Wrought Scrap, $13.25 to $13.50 in net tons; Rerolling Rails, $15.25 to $15.50, gross tons; Busheling Scrap, $10.50 to $10.75, net tons, and Cast Iron Borings, $6 to $6.25 in gross tons.

Coke.—For the past week the supply of cars in the Connellsville region has been better than for two months, and shipments have shown a large increase. Strictly Connellsville Furnace Coke for prompt shipment is held at about $1.65 a ton and 72-hour Foundry at $2.25 to $2.50 a ton. The demand for both Furnace and Foundry Coke is very active, and more than 75 per cent. of the ovens in the Upper and Lower Connellsville regions are active.

Walter Kennedy, mechanical engineer, has removed his offices from 611 Penn avenue to the new Bessemer Building, Sixth street and Duquesne way, Pittsburgh.

E. B. Leaf & Co., 1242 Real Estate Building, Philadelphia, have opened offices in room 1206 Keystone Building, Pittsburgh, with Jos. W. Thurston of the Philadelphia office as manager. The firm handle Iron and Steel products, Scrap, Muck Bars, Refined Iron, Low Phosphorus Melting Stock, Steel Billets and Bars of special analysis.

The offices of James J. Mahon, consulting engineer, have been removed from Hamilton Building to room 413 House Building, Pittsburgh.

The offices of the Orient Coke Company, Charles J. Morse, secretary, have been removed from Uniontown, Pa., to Farmers' Bank Building, Pittsburgh.

D. F. Nisbet, consulting engineer, has removed his offices from 1418 Farmers' Bank Building to 409 Lewis Block, Pittsburgh.

The Passaic Steel Company.

At the annual meeting of the stockholders of the Passaic Steel Company the following were elected members of the Executive Committee: George Lee of the Transit Finance Company, Dudley Phelps of the Transit Finance Company, Benjamin Nicoll of Benjamin Nicoll & Co., C. H. Zehnder of the Scranton Bolt & Nut Company, Edward Kelly of the Wharton Furnaces, L. A. Waters, president of the Title Guarantee & Trust Company of Scranton, and H. F. Bell, president of the Citizens' Trust Company.

The annual report showed that the company have earned during the year the interest on their bonds with a moderate surplus—a satisfactory result considering the fact that the mill at Paterson, N. J., suffered from a tornado and from a flood, and that operations were interfered with by a labor strike and by the coal troubles. The new open hearth steel plant has been completed and now has a capacity of 100,000 tons of ingots per annum. By a resolution passed by the stockholders the Executive Committee is chosen by the directors and not by the president. The directors are the following: W. Cooke, G. Arnold, J. B. Cooke, J. K. Cooke, W. E. Cooke, A. C. Fairchild, E. B. Francis, Charles Harris, E. Kelly, J. D. Lazelle, G. A. Lee, J. R. Lee, B. Nicoll, Dudley Phelps, F. F. Searing, C. D. Simpson, T. B. Simpson, L. Arthur Waters and W D. Zehnder. The officers are: A. C. Fairchild, president; F. F. Searing, vice-president, and B. Cooke, secretary.

Blame for the Darlington Collapse.

The blame for the collapse of the iron and steel structure of the Darlington Hotel, New York, was fixed by the Grand Jury upon Eugene Allison, one of the owners, and upon the Building Department. Mr. Allison was blamed for having the structure erected according to unapproved plans, and the Building Department was censured for not detecting and stopping the work. The following findings were returned in that connection:

"The system of inspection in all buildings in process of erection at present in vogue in the Building Department is grossly inadequate. The number of inspectors is absurdly small. The compensation allowed them is insufficient to secure men of the requisite intelligence and capacity, and the men actually employed are not properly qualified for their positions.

"We find that French, the inspector, whose duty it was to examine the condition of the steel and iron work in the Hotel Darlington, was so grossly negligent in the performance of his duties that we consider him a person entirely unfit for his position, and recommend his immediate dismissal from the Department.

"We find that the Building Department of the City of New York is deserving of censure for failing to discover that the steel and iron structure of the Hotel Darlington had been completed to the eleventh story upon plans which had been disapproved."

The Grand Jury recommends that a law be passed prohibiting the erection of a steel and iron structure without the immediate supervision of the original architect or a competent expert, licensed by the city. Other recommendations are that building inspectors be required to be competent engineers of experience, and that they be better paid; that copies of all plans, with the action of the Building Department plainly marked thereon, be kept in all buildings in process of erection during the entire period of construction, and that inspectors shall be required to determine whether the work is carried on in connection with the plans; that inspectors be required to report daily what is being done to remedy reported violations of the Building Code in structures under erection, and that the Superintendent of Buildings or any person acting in his place be empowered by law to summarily stop work on buildings where in his judgment continuation of such work would endanger public safety.

The failure to indict either Edward Pole or Paul Schwandtner, the subcontractors who were held criminally responsible by the Coroner's jury, is explained as follows:

"We have found no indictment for criminal negligence against either Pole or Schwandtner, subcontractors for the steel and iron frame work of the Hotel Darlington, for the reason that we do not believe a conviction could be had in either case. Pole had only a financial interest in the firm, and was not personally concerned in the erection of the building, and because in the case of Schwandtner his ignorance is so great and his intelligence so limited as to render him practically incapable of appreciating the responsibility of his undertaking."

The new coke ovens erected in Chester, Pa., by the Semet-Solvay Company will be put in operation in a few days, and the first charge of coke will be pushed out. The construction gang has gone to Detroit, Mich.

Metal Market.

NEW YORK, April 6, 1904.

Pig Tin.—Earlier in the week under review the market showed considerable strength and prices advanced. The higher prices were held firmly and persistently until yesterday, when they began to totter. Values declined steadily, and to-day the market is back to the position it held a week ago. The statistical position at the first of the month was favorable to the stiffening tendency, but since then arrivals have been so heavy as to break down the strength. Since the first of this month 1670 tons have arrived. At the close to-day the market was as follows: Spot, 28.35c. to 28.65c.; April, 28c. to 28.50c.; May, 28c. to 28.60c. The London market is now 7 shillings 6 pence lower than it was at our last writing, to-day's cables naming £127 7s. 6d. for spot and £127 10s. for futures.

According to the statistics compiled by C. Mayer, secretary New York Metal Exchange, deliveries into consumption during the month of March were large, amounting to 3600 tons. The total for the first three months of this year shows a decrease of 700 tons, as compared with the same period of last year.

The combined deliveries of London and Holland for March were 430 tons larger than last year. For the first three months of this year the increase is 366 tons, as compared with the same period of last year.

Shipments from the Straits for March were 1936 tons smaller than for the same month of last year. For the first three months of this year the decrease amounts to 355 tons, as compared with the same period of last year.

Australia shipped 12 tons more in March, as compared with the same month of last year. The total increase for the first three months of this year amounts to 126 tons, as compared with the same period of last year.

The total visible supply for March 31 is 3835 tons below that of March 31 of last year.

The total statistics for Europe and the United States show:

	Tons.
Total visible supply March 31, 1904	15,662
Against visible supply February 29, 1904	16,450
Against visible supply March 31, 1903	19,497

Copper.—An upward movement of prices has been started by the large producers. It is based upon the recent heavy exportation and not upon any increase in demand here. Despite the advances made during the week under review there has been no scamper on the part of American consumers to cover their future requirements. Business is still as slow as it was at the old level of lower figures. At this writing the prices quoted by the producers are as follows: Lake, 13.12½c. to 13.37½c.; Electrolytic, 13.12½c. to 13.25c.; Cast, 12.87½c. to 13.12½c. The London market is also higher, with £58 12s. 6d. for spot, £58 7s. 6d. for futures and £62 15s. for Best Selected. The heavy exports which have offered the producers an excuse for raising prices have ceased at least temporarily, as the shipment thus far this month amounted to but 1100 tons. The total exportation of last month amounted to 22,675 tons. This brings the total for the first three months of the year 36,479 tons higher than that of the corresponding period of last year.

Pig Lead—Is steady and unchanged, with a fair demand for spot, which is somewhat scarce and is quoted at 4.60c. to 4.65c., from store. The quotations of the American Smelting & Refining Company are still based on 4.50c. for 50-ton lots of Desilverized, shipment within 30 days. St. Louis telegraphs 4.42½c. to 4.45c., and London cables an advance to £12 6s. 3d.

Spelter.—This metal is somewhat higher, with a considerable improvement in demand, and light offerings of spot. The market closed firm at 5.25c. to 5.30c. for spot, while St. Louis advanced to 5c., and London has advanced to £22 5s.

Antimony.—The market is firm and unchanged. At the close to-day Cookson's was quoted at 7¾c. to 8c., Hallett's at 7¼c. to 7½c., and other brands at 6¼c. to 6½c.

Nickel.—This metal is firmly held, with the usual volume of business passing. Large lots are quoted at 40c. to 45c., and smaller quantities at 50c. to 60c.

Quicksilver.—The tone of the market is steady. Flasks of 76½ lbs. are quoted at $47 to $47.50. London quotes £8 5s.

Tin Plate.—Conditions are unchanged. Business is still progressing on a good basis as to volume. The American Tin Plate Company are declining orders for delivery before May. Quotations are unchanged on the basis of $3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to $3.64, New York. Welsh Plates are 1½ pence higher, at 11 shillings 6 pence per box, f.o.b. Swansea.

Under date of March 28 the American Nickeloid & Mfg. Company of Peru, Ill., have issued a revised price-list. The new list quotes on all gauges of Sheets made of Nickeloid, Copperoid, Brassoid and Sheets polished on both sides.

Iron and Industrial Stocks.

The center of interest during the past week has been the preferred stock of the United States Steel Corporation. A great deal of uncertainty preceded the quarterly meeting of the directors, conflicting rumors being current relative to the rate of the quarterly dividend to be announced. Some of the reports stated quite positively that the rate would be not over 1¼ per cent., and might be as low as 1 per cent. Other reports were equally positive that the usual 1¾ per cent. would be declared. The stock, therefore, showed much nervousness, fluctuating between 58⅛ and 59¾ up to Tuesday evening. The new 5 per cent. bonds, on the other hand, showed increasing firmness, advancing steadily from 74¾ to 77. The common stock was neglected, ranging between 10⅞ and 11⅜. The declaration of the regular dividend was not announced until after the close of the Exchange on Tuesday. Wednesday morning the preferred stock advanced, selling up to 60¼ at the opening. Other industrials were comparatively quiet and fairly firm, and in some cases good advances were noted. Colorado Fuel advanced from 28 to 30½; Republic preferred from 42¼ to 47; Tennessee Coal and Iron from 38¼ to 40. Last sales reported up to 1.30 p.m. on Wednesday were as follows: Car & Foundry common 20, preferred 72¾; Locomotive common 22, preferred 82¼; Colorado Fuel 32; Pressed Steel common 28½, preferred 69; Railway Spring common 21, preferred 75; Republic common 7⅞, preferred 47; Sloss-Sheffield common 40½, preferred 83¾; Tennessee Coal 40⅜; United States Steel common 11⅜, preferred 60, new 5's. 77⅜.

Dividends.—Tennessee Coal, Iron & Railroad Company have declared a quarterly dividend of 2 per cent. on the preferred stock, payable May 2. Books close April 12 and reopen May 4.

Nova Scotia Steel & Coal Company have declared the regular semiannual dividend of 3 per cent. on the common stock, payable April 15.

Harbison-Walker Refractories Company, Pittsburgh, have declared the regular quarterly dividend of 1½ per cent. on the preferred stock.

Pennsylvania Light & Power Company, Pittsburgh, have declared the regular quarterly dividend of 1½ per cent., payable April 1.

United States Steel Corporation have declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable May 16. Books close April 19, and reopen May 17.

The New York Metal Exchange.

On Monday, April 4, the annual election of officers and committees of the New York Metal Exchange was held at the Exchange Building, corner Burling Slip and Pearl street, New York City, when the following were selected to serve for the ensuing year:

President, Robert M. Thompson of the Orford Copper Company.

Vice-President, Adolph Lewisohn of the United Metals Selling Company.

Treasurer, Robert L. Crooke.

Board of Managers—B. Hochschild of the American Metal Company, Limited; H. W. Hendricks of Hendricks Brothers, L. Nachmann, G. E. Behr of Behr & Steiner, Jesse Lewisohn of the United Metals Selling Company, William Jay Ives, George W. Jacques, and J. H. Lang of the National Lead Company.

The following were elected as members of the Arbitration Committee: Edmund Hendricks of Hendricks Brothers, Spencer A. Jennings of Bruce & Cook, J. Mitchell Clark of Naylor & Co., E. A. Caswell, and L. Vogelstein; and the following Inspectors of Election: C. H. Bolles, Jr., of Merchant & Co.; Robert Gentle, and Fred Steiner of Behr & Steiner.

The American Marine Transportation Company, Boston, have gone into the hands of receivers. The company were organized to carry on a shipbuilding business, and a schooner well on toward completion is a principal asset.

The Osborne Blind Adjustment Company are equipping a shop at 56 Harrison avenue, Springfield, Mass., where they will manufacture a patent blind adjuster and also an adaptation of the same mechanical principle for a transom lift. It is a Maine corporation, with authorized capital stock of $100,000. Heman Osborne, inventor of the device, is manager of the business.

Internal Combustion Engines.

In the James Forrest lecture delivered before the Institution of Civil Engineers, William H. Maw discussed "Some Problems in Engineering." His references to internal combustion engines are interesting: It is often said that internal combustion engines have reached their present state of efficiency almost entirely through the lessons afforded by the more or less crude trials and experiments of their makers and designers, and that they owe comparatively little to the researches of physicists. To a great extent this statement is undoubtedly true; but it is, I think, equally true that there has been reached a stage in the development of such engines at which a really systematic and exhaustive investigation of the conditions under which they work is calculated to afford most valuable aid.

As a matter of fact, the thorough investigation of the theory and practical working of internal combustion engines presents for solution problems at once so numerous and so varied as to tax to the utmost the skill and ingenuity of the experimenter. About six years ago the Institution of Mechanical Engineers appointed a Gas Engine Research Committee, and this committee has already issued two reports,* which, although they can only be regarded as touching the fringe of the subject, afford an excellent idea of the difficulties to be surmounted in carrying out researches of this character. Not only have entirely new experimental appliances to be devised and calibrated—and Professor Burstall has shown the greatest resource and perseverance in meeting these difficulties—but it has been found that many of the physical data, upon which we must depend for drawing our conclusions from observed facts, themselves require important revision. For instance, in the earlier experiments on gas engines it was assumed, in calculating the results of the ignition of certain explosive mixtures, that the specific heats of the gases forming the products of the explosion were constant at all temperatures. This assumption, however, is now generally regarded as erroneous, and there appears to be good ground for believing that with an increase of temperature there is a very substantial increase in the specific heats of such gases. While, however, the general fact may be regarded as proved, the numerical data necessary to enable that conclusion to be turned to practical account are far from having been fixed with certainty, and further determinations are greatly wanted.

Again, the value of experiments on internal combustion engines depends in a most important degree upon the accuracy with which variations of temperature can be observed, both in the cylinder before and during explosion and in the walls of the chamber in which the explosion occurs. Engineers owe a great debt of gratitude to Prof. Hugh L. Callendar, for his earnest labors in perfecting devices for securing accurate thermometric observations at high temperatures; but even with these appliances available, the determination of the temperature of exploded gases is by no means a simple matter. As Professor Callendar has himself pointed out, the temperature assumed by the platinum wire of an electrical resistance thermometer exposed to such gases must necessarily be less than that of the gases themselves, partly owing to the time required to communicate the heat from the gases to the wire, and partly owing to the fact that while it is being heated by conduction the wire is suffering loss of heat by radiation. In dealing with low temperatures this latter loss is a comparatively unimportant matter; but it is a loss which appears to increase as the fifth power of the absolute temperature, and in the case of such temperatures as have to be dealt with in internal combustion engines it has, therefore, a most material effect. Moreover, the rate at which heat is communicated from the gases to the wire is dependent not only upon the difference of temperature, but also on the pressure, in a way not yet accurately known; and thus the accurate determination of the results of explosions in internal combustion engines means not merely the skillful use of known appliances, but the determination of certain physical constants involving much expenditure of time and labor. I have mentioned these two instances only; but they might be multiplied almost indefinitely, so numerous are the branches of inquiry which the exhaustive investigation of internal combustion engine opens up. It must be further remembered that such engines include not only gas engines properly so called, but also the numerous varieties of oil or spirit engines, as well as a few engines in which gases are generated by the combustion of solid matters injected into the cylinders. Then, again, the effect of the injection of water, or water vapor, into the cylinder in itself offers much scope for investigation, as does also the influence of the quality and quantity of the lubricating oils on the gaseous mixture. There thus arise numerous chemical questions, and other branches of inquiry, differing materially from those with which an engineer has usually to deal, and in the conduct of which the aid of trained physicists will be of the utmost value.

Then, again, apart from the problems presented by internal combustion engines as now made, there are others which may be expected to arise out of the evolution of new types—including possibly some forms of turbine motors. Internal combustion engines have already realized very considerable efficiency as heat motors, but it is well recognized that they are subject to very important losses of heat by radiation, by conduction through the cylinder walls, and by the heat carried off in the exhaust, and efforts are constantly being made to reduce these losses. The governing of internal combustion engines and the regulation of the powers developed by them at various speeds and under varying conditions, are also matters which present many unsolved problems.

The question of securing high efficiency in gas engines has, during the last two or three years, acquired additional importance from the construction of these engines to develop large powers, and to utilize blast furnace gases. It has been stated by Messrs. Cochrane, as a result of their experience, that the gases from a blast furnace making 120 tons of Cleveland iron per day are capable, if utilized in a gas engine, of developing 4500 horse-power continuously. This corresponds to 37.5 horse-power developed continuously for each ton of iron produced per day. Of course, the value of blast furnace gases for power purposes will vary with the class of ore smelted and other circumstances; but even if we reduce the power available to 30 horse-power per ton of iron made per day, then, with our British output of over 20,000 tons of pig iron per day, we get 600,000 horse-power as capable of being generated continuously by the utilization of our blast furnace gases, these gases thus replacing a consumption of, say, between 4,000,000 and 5,000,000 of tons of coal per annum. It would, however, be out of place for me, in an address of this kind, to dwell at greater length on this particular matter; but I hope I have said enough to show that even internal combustion engines alone afford a crop of unsolved problems, sufficient to occupy a large staff of investigators for many years to come.

* Proceedings of the Institution of Mechanical Engineers for 1898, p. 209, and for 1901, p. 1031.

Announcement is made that the Supreme Court of the United States has confirmed the decision of the Circuit Court of Appeals, sustaining the Boyer hammer patents, and that the Chicago Pneumatic Tool Company will at once apply for injunction against infringing manufacturers.

The General Arbitration Board of the New York Building Trades, representing the majority of employers and skilled workmen in the building industry, adopted a resolution at the Building Trades Club meeting on Tuesday evening, which provides that all striking bricklayers and laborers, 16,000 in all, are to return to work, pending arbitration. It is to be hoped that this will end this year's labor troubles in the local building trades.

The Elevator Airbrake & Equipment Company, Pittsburgh, Pa., have been chartered with a capital of $15,000. James T. Stein of Pittsburgh, Pa., and D. C. Jenkins and H. M. Jenkins of Allegheny are directors.

The New York Machinery Market.

NEW YORK, April 6, 1904.

Developments in connection with the several large projects which are claiming the attention of the machinery trade have not been as rapid as it was generally expected they would be. The matters are all practically in the same position as they were a week ago. While these big deals are moving forward slowly, no apprehension is felt as to a possibility of their not being carried through to the point of consummation. There is no doubt that they are going through, and the apparent delay is due entirely to their magnitude and the enormous amount of preliminary details which must be attended to before contracts can be placed. Judging from the widespread interest shown in these affairs and the eagerness to bid which is being manifested in all branches of the trade, there will be some lively competition when the closing stage arrives. There may be one exception to this rule, however, and that will be in connection with the furnishing of the equipment for the two great power stations to be used for operating the Pennsylvania tunnels. The trade are as much in the dark as to this proposition as ever. It is known that the engineering details of the work are in the hands of Westinghouse, Church, Kerr & Co. It is also known that certain large concerns have been in communication with the Pennsylvania Railroad officials, with a view of furnishing the entire machinery equipments for the power stations. What relations Westinghouse, Church, Kerr & Co. will bear in the purchasing of the equipment is a matter of conjecture. This is the point which is receiving a good deal of discussion in the trade. So far as we can learn, the prominent manufacturers of power plant apparatus have not been approached by either the Westinghouse interests or the Pennsylvania Company for bids on their respective lines of manufacture. Some of these manufacturers know that their apparatus is specified. One view which is given considerable credence in the trade is that the Pennsylvania Company will consider blanket proposals covering the entire equipment of both stations, and that Westinghouse, Church, Kerr & Co. will put in their bid just the same as any outside concern qualified to undertake the work.

While these points are in dispute, other portions of the project are moving along nicely. The awarding of the contracts for the tremendous amount of cast iron work for the tubes is thought to be near at hand. The North River section, we are informed, will be settled about the 15th inst. While there have been several schemes afoot for the building of large new foundries to handle this work, they seem to have fallen through, and the indications are that the work will be handled by existing foundries. There is now some talk of the possibility of the building of a new steel foundry at Altoona by the Pennsylvania Railroad for handling the steel castings. This is simply rumor, however.

Extensive purchases of conveying machinery will soon be made by the Pennsylvania Railroad, the use of which must be primarily charged up to the tunnel project. The company are building a pier which will be 1 mile long and will extend from Greenville, N. J., to the deep water channel of New York Bay. A system of gantry cranes is to traverse the pier, connecting the head of the pier with an elaborate yard system in Greenville. The materials for driving the tunnel and the excavations from the tunnel will be transferred from vessels to cars, and *vice versa*, at this point. Bids are now being received for the gantry cranes. There will be five of them. One is to have a capacity of 50 tons, and four will be of 10 tons capacity each. L. H. Barker, principal assistant engineer of the Pennsylvania Railroad, located at Jersey City, has the matter in charge.

The contractors who have been awarded contracts for constructing the North and East river sections of the tunnel have not as yet placed any orders for machinery. At the offices of Carr Bros. we are informed that nothing will be done in this way for at least six weeks. Within this time Mr. Mozer, one of the firm of S. Pearson & Sons, is expected to arrive in this country and open offices for the direct supervision of the East River section of the work. Mr. Mozer will attend personally to the selection of the machinery required.

At the O'Rourke Engineering Construction Company's offices it was stated that while proposals for furnishing all sorts of machinery are being received, the matter will not be taken up for purchasing for some weeks.

As to the land portions of the work which have not been contracted for, it is generally expected that the Pennsylvania Railroad Company will perform the work themselves. This includes all of the tunneling under Manhattan Island, and that beyond the shafts on both the New Jersey and Long Island shores. There is over a mile of tunneling to be done on the Jersey shore.

The appropriation of about $5,500,000 for the installation of a high pressure salt water pumping system for fire service in New York City means the necessity of placing large contracts for pumps, hydrants, piping, &c., after the appropriation is approved by the City Council.

It seems that the Brooklyn Rapid Transit Company are not letting the contracts for their 100,000 horse-power electric station, on Kent avenue, Brooklyn, in a large measure because their engineers are not satisfied as to the comparative efficiency of the steam turbine and the reciprocating engine. It is their intention to install the most modern and economical electrical apparatus, and though they feel favorably disposed toward the turbo-generator, nothing definite will be decided until a thorough investigation has been made of the working of steam turbines in other large plants. It is also their intention to make a thorough test at one of their own power houses, and for this purpose a 5500-kw. turbo set, which, it will be remembered, was purchased from the General Electric Company some time ago, will soon be installed. The company have received preliminary bids on the entire equipment, but as yet no contracts have been awarded, not even that for the construction of the building. As the company are very much in need of extra power, it is thought that early deliveries will be an important factor in the letting of the contracts. One of the large turbine manufacturers promises deliveries as early as August. We can state on good authority that contracts for the complete equipment will be closed by the middle of June. Regarding the current reports that the Brooklyn Rapid Transit Company have secured a loan of $10,000,000, we are officially informed that there is no truth in the rumors.

The Nassau Electric Light & Power Company are in the market for a 3000-kw. generating set, to be installed in their new station at Hempstead Harbor, L. I. The two 1500kw. sets now being operated by the company are also to be removed to the new station. C. O. Mailloux, electrical engineer, of 76 William street, has been retained by the company in a consulting capacity.

The matter of purchasing steam specialties, such as feed water heaters, is now approaching a close in connection with the great electric power stations to be built by the New York Central Railroad. The orders for the larger apparatus, it will be recalled, were placed some weeks ago.

It is reported that the plans for the big power station to operate the cars in the New York subway may be changed, so as to provide for the use of turbo-generators instead of the reciprocating engines direct connected to generators as contracted for. It will be recalled that the order for the engines was awarded to the Allis-Chalmers Company.

Shipments of 10,000 horse-power of feed water heaters have just been made by the Goubert Mfg. Company of 85 Liberty street, New York, to the St. Louis & Suburban Railway Company.

McClave, Hamilton & Co. received the order for the generating sets to be installed in the new hotel at Eighty-first street and Columbus avenue by the Manhattan Realty Company. The order calls for two 125-kw. and one 100-kw. sets.

The Draper Company of Hopedale, Mass., who are enlarging the capacity of their works by the installation of new machinery and the adding of new buildings, have awarded a contract for a 10-ton pneumatic jib crane to McClave, Hamilton & Co., who are the Eastern sales agents for the Case Mfg. Company of Columbus, Ohio.

The Southern Railway, who through their purchasing department at Washington, D. C., have been buying a considerable amount of new machinery for their various shops, are now in the market for cranes to be installed at Spencer, N. C. The specifications call for two 65-ton, one 10-ton and one 5-ton electric traveling cranes.

Further particulars are now at hand concerning the recent purchase of the Bollman-Wilson Foundry, adjoining the Bullock Electric Company's plant, at East Norwood, Ohio, by the Allis-Chalmers Company, Chicago, which was noted in our Cincinnati iron market last week. The Bollman Foundry has for some time been making the castings for the Bullock Company, and it is a natural consequence that the foundry should be taken over by the Allis-Chalmers Company, with whom the Bullock Electric Mfg. Company recently became affiliated. The price paid for the foundry is said to be $100,000. Upon good authority it has been learned that the Allis-Chalmers Company intend to abandon their Dickson Works, at Scranton, Pa. While nothing official can be ascertained, it is understood that the equipment will be moved to their Chicago and Milwaukee plants.

The New York Butchers' Dressed Meat Company, 510 West Forty-second street, New York, are purchasing the equipment for their new abbatoir at Eleventh avenue and Thirty-ninth street. They recently placed orders for 1600 horse-power of Sterling boilers. As stated in these columns last December, the company will instal a larger amount of new machinery, including besides the power equipment, a great deal of special machinery, pumps, conveying machinery, &c., and probably a small machine shop outfit.

The Ajax Mfg. Company, Cleveland, Ohio, through their New York office, have recently sold to the Grand Trunk Railway System one of their large heading, forging and upsetting machines, a large bulldozer, also a hot pressed nut machine. They will be installed in their Montreal shops.

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., have filed plans for a new crane shop, 42 x 319 feet, to be erected in their yards.

The plans of the Pennsylvania Railroad for the erection of their large repair shops at Millham Junction on the New

Jersey and New York Division, two miles east of Trenton, N. J., are being rapidly formed, and it is expected that the actual work of construction will begin very shortly. There will be seven buildings in the group, the ground for which has been laid out by the engineers and the contract for the foundations has been let. The company are now engaged in the preparation of the plans for the superstructures.

In connection with the proposed new shops of the Atchison, Topeka, & Santa Fé Railroad, at La Junta, Col., it will be interesting to note that bids will be asked about April 15, through C. A. Morse chief engineer, Topeka Kan., for the construction of the buildings. Besides the machine shop, 154 x 398 feet, there will be a blacksmith shop, 80 x 150 feet, power house and other smaller buildings.

This last week another large project that will necessitate the purchase of a great deal of mechanical equipment was announced. The Missouri Pacific Railway Company inform us that it is their intention to erect large machine shops at Sedalia, Mo., but the plans are not yet perfected, and details as to dimensions of the proposed new buildings are not available. We understand that the company are to receive a bonus and a site of 120 acres at that point, and that the new shops are to cost, complete, about $1,000,000.

The Bureau of Yards and Docks, Navy Department, Washington, are having specifications printed covering the purchase of machinery for a power plant at the New Orleans navy yard. There will be required four boilers, a smoke header, one fuel economizer, two boiler feed pumps, one feed water heater, two steam turbo generating sets, with condensing apparatus, two exciter sets, switchboard, wiring, &c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 19 for the following electrical equipments for the United States Navy, consisting of motors, controllers, &c.:

Item 1. Sixteen for 12-inch ammunition hoists.
2. Sixteen for 12-inch rammers.
3. Thirty-two for 8-inch ammunition hoists.
4. Sixteen for 8-inch ammunition hoists.
5. Forty-eight 8-inch elevating equipments.
6. Forty-eight for 8-inch rammers.

The Bureau of Yards and Docks will receive bids until April 30 for improving and erecting the 100-ton steel shears at the Boston navy yard. Funds available, $19,500.

The following awards have been made for supplies for the New York navy yards, bids for which were opened March 15:

Holzer-Cabot Electric Company, Boston, Mass., class 1, 16 electric motors, $5269.

Thresher Electric Company, New York, class 3, six generator motors, $5002.

General Electric Company, Schenectady, N. Y., class 4, six generating sets, with long list of spare parts, $34,809.

Handlan-Buck Mfg. Company, St. Louis, Mo., class 53, one power punching and shearing press, $415.

Erie Foundry Company, Erie, Pa., class 54, one 8-foot squaring shear, $1200.

S. A. Woods Machine Company, Boston, Mass., class 56, one heavy self feed rip saw machine, $1200; class 58, one giant dimension planer, $1960.

Niles-Bement-Pond Company, New York, class 57, two new model engine lathes, $874.

No awards were made for class 2, one slow speed six-pole single field coil electric motor; class 52, one turret head bolt cutting machine; class 59, one six-roll double surface planing machine.

An error was made in the address of the recently organized Economy Engineering Company, New York, in these columns last week. The offices of the company are located at 150 Nassau street, and not at 150 Warren street as stated.

The Bullard Machine Tool Company of Bridgeport, Conn., have discontinued their New York office, which was located at 95 Liberty street. S. H. Bullard, who was the manager of the New York office, will continue with the company as traveling sales engineer and will make his headquarters at Bridgeport.

The Stacy Mfg. Company, Cincinnati, Ohio, manufacturers of gas holders, oil and water tanks, are erecting a new plant 150 x 500 feet.

Leo Haight has been appointed receiver of the Southwestern Portland Cement Works, White Cliff, Ark. The plant is valued at $5,000,000 and has a daily capacity of 1000 barrels.

The Barberie Locomotive Appliance Company, Park Row Building, New York, have incorporated for the manufacture of an automatic appliance to prevent the locomotive from passing any given signal. Marcus Dunn is president; John Barberie, vice-president and treasurer; Thomas C. Connor, secretary, and Thomas J. Walsh, engineer.

Chicago Machinery Market.

CHICAGO, April 2, 1904.

With few exceptions Western manufacturers of machinery and tools speak encouragingly of the present situation and the prospect. The "seven lean months" from last August to the present February, led to a gradual curtailment of output and reduction in men employed. The tide seems to have turned in February, in some cases as early as the middle of January, and the gradual improvement since then has led to the employment of more men, until plants in the machinery industry of the Middle West are now employing from 75 per cent. to their full normal working force. With the half time or idleness of earlier months fresh in their minds, it is not likely that machinists' unions will stir up much strife this spring. The demand for wood working tools and mining machinery does not seem to have suffered quite as badly as did the trade in strictly metal working machines, though the severity of the winter has prevented mines in the Lake Superior country from carrying on needed improvements, and firms that depend largely on this trade have been badly crippled. They hope for a revival in this trade following the marked improvements in demand for iron, and rush orders already coming in give them some encouragement. Foundries and contract boiler shops have been quiet all winter, some for lack of business and many because they did not have heating facilities sufficient to make their places habitable for their workmen. The lesson of the winter is being reflected in a widespread inquiry for estimates on heating plants.

Builders of both steam engines and high pressure steam boilers are feeling the effects of the increasing popularity of the gas engine, and this competition becomes more formidable as the gas engine units increase in size. The rapid growth of great central electric power stations, that sell power and light to individuals at less cost than if produced in isolated plants, is also seriously affecting the engine and boiler building trades. That this is more than a theory is evidenced by the fact that such firms as the Allis-Chalmers Company and the Holthoff Machinery Company deemed it necessary to reorganize their companies so as to consolidate with powerful factors in the electric machinery world. It is also illustrated by the fact that boiler plate and boiler tubes are slower in demand than any other lines of finished steel and iron in the Western markets.

Engines, Boilers and Pumps.

The Charter Gas Engine Company, Sterling, Ill., say that the trend of business in their line is upward, and they have booked orders for three carloads this year, which is favorable for the season, and especially for this year. The company are having no difficulty with labor and do not expect anything of the kind.

The Quincy Engine Works, Quincy, Ill., report that the demand for their engines is unchanged, except for the fact that inquiries seem to show a larger proportion of small engines required than heretofore. Just at present there is a noticeable increase in the number of orders received. There had, however, been a marked decrease in the demand in the months of January, February and March, as compared with the corresponding period of last year.

The Whitehead Machinery Company, Davenport, Iowa, report that the demand for second-hand engines and boilers picked up considerably in the last 30 days. They find a pressing demand for large boilers, both tubular and water tube. Inquiries are coming in freely. The chief demand in engines seems to be for medium sizes of the Corliss type, with usual equipment in the way of boilers, pumps, heaters, &c.

The American Steam Pump Company, Battle Creek, Mich., see a tendency for business to pick up in their line, as March business has shown a considerable increase. Prices range the same as they have for some time. The company are working on several new models, which will be out in a few months.

The Power & Mining Machinery Company, Cudahy, Wis., say that the general condition of business in their lines at the present time is good. They have taken a number of good sized orders for mining equipments during the month of March and have many inquiries, which seem to be from parties actually considering improvements. Their orders are increasing and, from the present outlook, there is every reason to believe that business during the coming summer is going to be better than they expected. They are at the present time engaged in extending their plant, having provided for an expenditure of about $600,000 in that direction. The company have been obliged to hold up somewhat in the taking of orders for the reason that their present facilities are limited, and to take care of such orders as they now have

requires the operation of their plant 24 hours in the day, including Sundays.

Machine Tools.

The Ransom Mfg. Company, Oshkosh, Wis., makers of grinding and polishing machinery, state that business is better than it was during December and January; in fact, there has been a bettering of trade ever since the first of the year, but the volume of business during January, February and March will not average the same as last year for the same months. The company have made important improvements in several of their machines during the past winter, to which they attribute, in part, the increased trade of the past month. They believe that the general outlook for business to-day is better than it was a year ago at this time.

The Fox Machine Company, Grand Rapids, Mich., makers of machine tools and special machinery, find that there has been a large falling off from the business of a year ago. This they attribute to Wall Street speculation, to the fact that it is a Presidential year, and also to the severity of the past winter and the destructive floods which have been prevalent throughout the West during the past few weeks.

The American Machinery Company, Grand Rapids, Mich., builders of wood working machinery, report a general improvement in the trend of the machinery business at the present time. They have secured several of the largest contracts in the history of their business during the first three months of 1904, and all for the best and most expensive machines, and have now pending much more than the usual number of prospects for this class of machinery; this in spite of the unusual severity of the winter and eary spring, followed by the general floods, which have to a great extent held up building projects that during ordinary seasons would have been finished and reody for the installation of the machinery. They find that the demand has been greater for the best class of machinery during the past three months than during the same months in 1903, with this difference; that a year ago, when customers were placing orders, they anticipated delay and were subsequently insistent on early deliveries, while at this time production has caught up with the demand to such an extent that buyers take as a matter of course reasonably prompt shipment, and the fear of not being able to get them will not induce them to place orders until they are actually in need of the machines. The company are adding to their line a number of new machines, and it is apparent that in some way they must secure additional facilities for manufacturing at an early date, but the method of doing this has not yet been decided on.

Hill Tool Company, Anderson, Ind., find business is picking up considerably, and in the past week they have received several very large orders. The company are putting on the market several new articles in the way of drill holders, and a cold saw cutting off machine, as well as several other articles. Their foreign business has been up to the usual standard with the exception of trade in Germany, which has fallen off somewhat in the last five months.

The George Whiting Company, Chicago, builders of punches, shears, rolls and other heavy iron working tools, are very busy at the present time, working a full force of men, and have booked orders quite recently that have been held off for a number of months. They observe quite a little inquiry for new machines and a tendency on the part of the manufacturing interests to investigate very closely everything that will tend to reduce cost. Business in general may be said to be improving at present, with indications for a steady business throughout the year 1904. They have recently completed for the Illinois Steel Company a plate roll embodying novel features.

The Novelty Iron Works, Dubuque, Iowa, experienced a decided increase of business during the first quarter of 1904, there being a better showing than during the first quarter of 1903. The machines mostly in demand at present are the improved Boss power hammer and the Victor punches and shears. A number of machines have been exported, and the outlook in that branch is more encouraging than it has been for some time. The demand in the South for shingle sawing machines is increasing to such an extent that they are now behind orders in that department.

Special Machinery.

The Kempsmith Mfg. Company, Milwaukee, Wis., report their business on milling machines for the month of March the best they have had in the past year for any single month. Among the orders received are seven machines for export. They feel that the general demand for machinery to-day is for a better grade than it was a year or so ago, and believe that the present year, taken altogether, will be a very satisfactory one.

The Hoefer Mfg. Company, Freeport, Ill., builders of drill presses and special wire and metal working machinery, state that business keeps up very well, particularly in the special machine department, in which they are overwhelmed with orders. They are contemplating the erection and equipment of a new and up to date plant throughout this coming summer, expecting thus to have more room and increased manufacturing capacity.

The Scully Steel & Iron Company, Chicago, heavy iron jobbers and dealers in metal working machinery and tools, say that their business for the pest few months has been quite satisfactory. They have noted particularly a good demand for the higher grades of material, such as Tyler knobbled charcoal iron boiler tubes and the fire box grade of plate steel, although the demand for the general line during the first three months of this year was not as large as during the corresponding period of last year. They have recently added to their warehouse a large machinery exhibit room, which will in the near future be equipped with a sample of each of the various boiler makers' machine tools that they handle.

The Goodman Mfg. Company, Chicago, builders of coal mining machinery, report that business has kept up as well as usual, and they look for a prosperous year.

Tools and Supplies.

Charles H. Besly & Co., Chicago, say that business with them has steadily grown better since the first of the year. The demand for grinders seems to be more uniform throughout the country than it has been for some years. They are experiencing an excellent demand for such specialties as oil and taps. Many factories which during the latter part of last year were shut down are now running to their full capacity, and the outlook is favorable for a good year's business.

The Chicago Pneumatic Tool Company, Chicago, report their business for the current year highly satisfactory. They say that the tendency on the part of the trade is to purchase complete pneumatic equipments from a single manufacturer rather than to purchase various types of compressed air appliances from various makers, and they have, during the month of March, received several orders for complete equipment of this character. Business for the first quarter of the present year is almost doublt that for the corresponding period a year ago, and the month of March surpassed in volume of business received any other month in their history.

Power Transmission Machinery.

The Industrial Works, Bay City, Mich., state that business in cranes, hoists, &c., is quiet at the present time, and much below the corresponding period of last year.

The Ætna Foundry & Machine Company, Springfield, Ill., builders of coal mining equipment, say that the general trend of business seems to be downward, and there is no special demand for any line of their manufacture. The present attitude of organized labor seems to be arbitrary without any regard to the existing conditions, and labor costs at the present time are fully as high as, if not higher than, a year ago, whereas the cost of materials has been reduced. The threatened coal miners' strike in that section has, of course, a direct effect on their business, and until it is decided, will curtail the investment in mining equipment. In case the strike is averted, the demand for coal mine equipment will probably be good for the remainder of the year.

The Reeves Pulley Company, Columbus, Ind., report that both the wood and metal working departments of their factory are comfortably employed. Their wood split pulley business has been extremely good this year so far, and the variable speed transmission department has also been very busy. There is also a good demand for wood split pulley clutches. It seems that general trade conditions are somewhat improved over what they were in January and February, and that, barring some unforeseen trade disturbances, we ought to have a good year's business.

The Stephens-Adamson Mfg. Company, Aurora, Ill., makers of transmission machinery, report a decided improvement in business during the last two weeks. Things seem to be picking up all along the line. They have not at any time during the winter been short of work, and in looking over their books find that business for January, February and March has almost doubled that of last year. The company have made a few installations of machinery during the first three months, but do not contemplate many improvements. Judging from the way business has come in during the past two weeks, the number of inquiries they are receiving now and their character, they anticipate a very busy season.

Miscellaneous.

The Browning Company, Milwaukee, Wis., found the motor business for the month of March excellent and fully up to any month's business during the previous year. The attitude of purchasers is decidedly toward a high class of machinery. They have quite a quantity of motors on order for Government work, and have recently secured the contract for the Helvetia Milk Condensing Company, Delta, Ohio, for between 30 and 40 motors. They believe that the year's business, taken as a whole, will be a very satisfactory one.

The Chicago House Wrecking Company, Chicago, have discovered no apparent change in the business situation during the past 30 to 60 days. Inquiries for second-hand engines, machines, materials and supplies continue to be very large, and they are making an average number of sales. Business for March, 1904, exceeded the same month of the

previous year by 10 per cent. and was 20 per cent. heavier than either January or February of this year. The company look forward to a very heavy business during the next 60 days.

The S. Obermayer Company, Chicago and Cincinnati, manufacturers of foundry equipment and supplies, say that their sales have not been as large in dollars and cents in comparison with the same time last year; still they find that they have done a very satisfactory business. They notice that the falling off in business has been in the equipment department, there not being as many new foundries installed nor as many improvements made in the foundries at the present time as last year.

The Philadelphia Machinery Market.

PHILADELPHIA, April 4, 1904.

Conditions in the Philadelphia machinery market during March show but little improvement when compared with the previous month. February was dull, and it was expected that March would show improvement in all branches of the trade, but both manufacturers and dealers have been disappointed. In some lines, such as molding machines, power transmission machinery and pneumatic tools, exceptions are to be noted, as manufacturers of these lines have had a good month's business, a considerable portion of which has been for export. Buyers continue to delay placing orders and confidence in very active resumption of trade is not strong. The volume of work on hand varies. Some have their plants comfortably filled, but these are exceptions rather than the rule. The greater portion are working with diminished forces or on shorter working hours. Large specifications are notable in their absence, the usual run of business being made up of small quantities of single tools or machines, or just what is necessary to meet immediate requirements, and in frequent instances it is not the case of the best that can be bought, but that which can do the most work at the lowest possible price. In point of activity the builders of large special tools, engines and machinery lead. Locomotive builders and manufacturers of heavy standard tools are only fairly active, while those making smaller standard and special tools vary from extreme activity to extreme dullness.

Inquiries have in most cases continued just as numerous, but instances are noticeable in which a considerable falling off has taken place during the last half of the month. Estimating departments are generally busy, as buyers are said to be making very full inquiry before considering the article recommended for purchase, and the duplication of inquiries therefore continues. Inclement weather has probably deferred placing of orders in many cases, but with stocks on hand in most cases, both in manufacturers' warerooms and on dealers' floors, no necessity for giving the order previous to the time that the goods are actually required is apparent. Cold weather has delayed building improvements to some extent, and equipments contemplated have been correspondingly delayed.

Deliveries generally can be made promptly, particularly in medium and smaller tools, and frequently it is quite possible to get heavy goods on short notice. Good deliveries can also be made on special tools, as almost everything entering into their construction, except possibly that of motor drives, can be had very promptly. Manufacturers have, as a rule, a considerable stock on hand, while dealers' floors continue well filled.

Foreign demand, as far as machinery and tools are concerned, is unchanged, with little indication of improvement. In the special lines, however, some improvement is noticeable, and orders on established lines have in recent cases been doubled. For certain classes of pneumatic tools, England is expected to be a large buyer during the coming year.

Iron and steel castings continue in good supply, most of the foundries being able to make very prompt deliveries. Work is being diligently sought after, and, it is said, that if necessary to close a good order, concessions on price are being made. Raw materials in the foundry trade are promptly obtainable, but the labor question is far from satisfactory.

Machinery merchants generally have had an unsatisfactory month. Inquiries are fair, but it is reported hard to get the prospective buyer to place the order. Showroom floors are well stocked, as are also warehouses, and immediate deliveries can be made on most classes of tools. The month's sales are said in most cases not to have aggregated greater totals than during February.

The market for smaller engines and boilers has been inactive, weather conditions being still unfavorable for the installation of these goods, but a marked increase in this trade is expected to develop with the opening of the spring. Machine shop supplies and the smaller tools are inactive, reflecting the general condition of the market.

Prices nominally are unchanged, but competition has caused a readjustment of discounts on some lines. Some makes of machinery and tools are said to be held very firm, but in close bidding these lines generally lose the business. Lower figures, it is contended, are not warranted by conditions, but stocks on hand have probably reached a volume making it necessary that they be converted into funds, and prices must, therefore, be adjusted somewhere nearer the views of the prospective buyer.

The New York Ship Building Company recently launched the large steel passenger and freight steamer "Ontario," building for the Merchants' & Miners' Steamship Company. This vessel is 325 feet length over all, 42 feet beam and 34 feet in depth. Activity in all the local ship yards has been more or less interfered with by the extreme weather during the past winter, and considerable more business is anticipated during the coming spring months.

The Pennsylvania Forge Company, recently incorporated under the laws of Pennsylvania, have the erection of a forging plant under way at Bridesburg, Philadelphia. It is expected that the plant will be ready for operation in a few weeks. Connecting rods, crank shafts, die blocks, rolls and other steel forgings will be among their specialties.

Plans have been prepared and filed with the bureau of city building inspection for a large addition to the crane shop of the William Cramp Ship & Engine Building Company. They provide for a building of corrugated iron on a steel frame, one story high, 42 x 319 feet in dimensions.

The Standard Plunger Elavator Company have received the contract for the installation of the elevators in the new stores building for John Wanamaker in this city and New York. There are 101 elevators in all, 64 being for the local and 37 for the New York store. The contract price for the above is said to aggregate $1,250,000.

The Midvale Steel Company, in order to manufacture the armor plate orders recently acquired, have a number of additions in view. Bids will be received at an early date for the erection of a tempering plant, which will include a main building, 68 x 504 feet; a gas house, 32 x 378 feet, and a furnace shed, 68 x 432 feet. Work will also be begun in a short time on the new open hearth plant, previously mentioned, the contract for which has been let to the S. R. Smythe Company, Pittsburgh, at a cost of about $75,000.

The Standard Pressed Steel Company, manufacturers of the American Pioneer pressed steel shaft hanger, are running all departments actively, in order to have a stock of various sizes of their new shaft hangers to meet the increasing demand for these goods. This hanger, they advise us, is meeting with great favor among the trade.

The American Pulley Company have recently acquired late patents covering the manufacture of pressed metal sheaves, and will shortly place a line of them on the market. They will be made in sizes from 2 to 36 inches in diameter. The company during March booked a large number of orders for pulleys. The foreign demand has improved particularly and in some instances export orders have doubled those formerly placed. All departments of their plant, therefore, are more active than they have been for several months. Among some recent foreign shipments were those made to Australia; Geneva, Switzerland; Christiana, Norway; Ecuador, South Africa, England and two to Aukland, New Zealand. Domestic deliveries in carload lots include shipments to Ridgway, Pa.; Chicago, Ill.; San Francisco, Cal., and Chattanooga, Ala. Local deliveries have also been large.

The Espen-Lucas Machine Works have found the past month a slight improvement over February, but are still able to handle more business. Inquiries have been fairly numerous, and prospective conditions are said to appear favorable. Some recent shipments of cold saw cutting off machines include three rail saws to Buffalo, N. Y., parties, and one to a Texas concern. Crank shaft and forge saws have been delivered to Ohio and local parties. A large boring mill was also shipped to parties in the Central West.

The Falkenau-Sinclair Machine Company report a good month's business. While there have been no particularly large orders booked, there have been a number of smaller ones, sufficient to keep the plant running regularly. Shipments have increased, being composed principally of single presses of different kinds for various purchasers, and a number of special machines for the Frankford arsenal, Philadelphia, on order of the United States Government. There has also been a good demand for testing machines, particularly their automatic cement testing machine, for which the past month's business has been in excess of any single month for some time.

The Eynon-Evans Mfg. Company report a very good demand for steam jet blowers. Shipments of these have recent-

ly been made to the Central Iron & Steel Works, Harrisburg, Pa.; the Reading Iron Works, to both the Tube department and the South works, and to the Lukens Iron & Steel Company, Coatesville, Pa. In their pattern department some large work is under construction for the various shipyards. The foundry is busy with orders for acid resisting bronze castings and general castings for ship work. More work, however, could be taken in their machine department, which is only fairly busy.

The Tabor Mfg. Company have had a busy month, the volume of orders being the best for more than a year. Shipments have been numerous and deliveries during March have been greater than in any month since March, 1903. The foreign demand continues fair, one large molding machine having recently been shipped to England. Among recent orders was one for seven power ramming vibrator molding machines for the Saco & Pettee Machine Company, Biddeford, Maine, to be placed in a shop where nothing but hand ramming stripping plate machines have been heretofore used. There is quite a demand also for large machines for molding tunnel plate castings, and propositions have been made to some 20 different foundries for machines suitable for this class of work. Recent deliveries include shipment of the balance of the order for six hand ramming stripping plate machines for the New York Air Brake Company, and a number of machines have been delivered to local foundries. The Tabor Mfg. Company have decided, in order to better look after their New England trade, to open an office in Boston, Mass. C. S. Lovell, who has represented the company at home and abroad for the last five years, will have charge of the Boston office, the location of which has not yet been determined.

The Philadelphia Pneumatic Tool Company are busy. While there has been a diminution of business in some branches of their trade, it has improved in others. The foreign demand is better, and prospective conditions are favorable for largely increased business from this source. In order to better take care of this trade the company have arranged with J. W. Tierney, formerly president of the company, to represent them in England in the interest of Keller tools. Mr. Tierney has recently sailed and will probably remain in England during the balance of this year. Foreign trade recently has come mostly from the ship yards and boiler plants of Germany and France, while in the domestic field the ship yards lead in point of demand, followed by the boiler plants and foundries, the structural demand being weak. This company have lately added several specialties to their line of tools, including a new port hole cutter and a pneumatic deck caulking machine.

The Alfred Box Company, Incorporated, have had plans prepared and will shortly begin work on the new girder shop previously reported. Business continues fairly active, recent orders including a large amount of machinery for the American Amusement Company at Coney Island, L. I. A 12-ton hand power traveling crane has been ordered by the United States Government for building No. 2 at the Brooklyn navy yard; a 3-ton electric traveling crane, for handling timber on the lumber docks of Hewson & Pearson, Philadelphia, and a 5-ton electric jib crane, the fourth of its kind, will be installed for Williamson Bros. Company of this city, while deliveries include a 10-ton electric traveling crane for the Schenectady shops of the General Electric Company; a hand power traveling and a hammer crane for the Pennsylvania Forge Company, Philadelphia, and several of the electric traveling cranes built for the Delaware River Steel Casting Company, Chester, Pa., have been delivered, while the balance of the latter are ready for immediate shipment.

The Energy Elevator Company have an order to install a hoisting equipment for the fire curtain in the Lycoming Opera House, Williamsport, Pa. This will include the full equipment, the same as was installed in Keith's Theatre in this city some time ago. The demand for elevators from out of town sources continues active, but there has been a decline in local requirements. All departments of their plant continue busy, and deliveries of elevators have been made at Rome, Ga.; Camden, N. J.; St. Louis, Mo.; Lewisburg, Pa.; Catskill, N. Y.; East Liverpool, Ohio, and Chester, Pa. These were all freight elevators. A large passenger lift was installed for Wilkes-Barre parties, and a special freight lift was put up for the *Daily Local News*, West Chester, Pa.

The Baldwin Locomotive Works continue fairly active, but are not being operated to their capacity. Orders during March improved materially, and aggregated a total equal to that of locomotives shipped. Among these orders were 67 for the Pittsburgh, Carnegie & Western road of the Wabash system, 45 of which will be of the Mogul type, 12 of the Atlantic type and the remainder switching engines. Thirteen locomotives were also ordered by the Atlantic & Birmingham Railroad; these are simple ten-wheel engines. Orders were also received from the Southern Railway for 25, and from the Atlantic Coast Line for 12 locomotives. A slight improvement is also to be noted in the foreign demand, orders for several engines for export having been booked. Deliveries during the past month have been fair, and include shipments on orders from the Pennsylvania, Philadelphia & Reading, Chicago and Northwestern, and other railroads, as well as to individual concerns.

National Metal Trades Association Notes.

CINCINNATI, Ohio, April 4, 1904.—Arrangements are being made for a meeting of the Administrative Council to take place during the latter part of April. The matter of revision of by-laws is still pending, and it will be in the hands of proper legal authority for approval, it is hoped, this week. The question as to the relation of local to national associations may result in a conference between the different district chairmen and heads of local associations. Experience of members, as shown at the recent convention by the reports of chairmen, goes to show the necessity for eliminating this really unnecessary duplication of work. At this time they will endeavor to formulate plans that will avoid such disturbances as have arisen in the past from this cause.

The National Metal Trades Association has become involved in the Chicago brass workers' strike through the Adams & Westlake Company. Commissioner Du Brul will leave for the scene of action to-night, with the view to an early settlement of the difficulty.

The Manufacturers' Association of Pittsburgh has issued a call for a meeting on Thursday evening, April 28.

The demands of the machinists of the Blakeslee Mfg. Company, Du Quoin, Ill., were presented to the company to-day, the outcome of which is not as yet known.

The manufacturers of Youngstown, Ohio, have asked their men to accept a 10 per cent. reduction. No reply has thus far been received as to what action the men will take in the matter.

The Administrative Council have elected Charles E. Hildreth of P. Blaisdell & Co., Worcester, Mass., to fill the vacancy in the Administrative Council caused by the retirement of Carl Horix of the George B. Sennett Company, Youngstown, Ohio, who had one year longer to serve.

The Orient Coke Company.

The Farmers' Deposit National Bank, Pittsburgh, are offering for subscription $100,000 first mortgage 5 per cent. 20-year gold bonds of the Orient Coke Company. These bonds are dated April 1, 1904, and interest is payable October 1 and April 1. The right is reserved to redeem the whole or part of the issue at any semiannual interest period after April 1, 1909, at 110, upon six weeks' prior notice. To take care of the bonds a sinking fund is required by a mortgage of 10 cents on every ton of coal shipped and 15 cents on every ton of coke shipped. This fund can also be used for the purpose of reinvestment in coal acreage with the consent of the trustee. An estimate by the company's officers of the gross earnings of the plant, with 450 ovens in operation, is $199,700, or nearly six times the interest on the bonds.

The Orient Coke Company own nearly 1200 acres of the Klondike field and 200 acres on Dunlap's Creek, in Fayette County. Most of the property adjoins the coal lands of the H. C. Frick Coke Company. The capital is $1,400,000 and bonds $700,000. O. W. Kennedy, formerly superintendent of the H. C. Frick Coke Company, has been elected manager. Julian Kennedy is president of the company, and the directors are as follows: Julian Kennedy; Charles J. Morse, secretary and general manager of the Ohio Iron & Steel Company; Henry M. Robinson of the law firm of Arrel, McVey & Tayler, Youngstown, Ohio; Howard M. Hooker of H. M. Hooker & Co., coke and pig iron brokers, Farmers' Bank Building, Pittsburgh; C. W. Jackson, manager coke department of Rogers, Brown & Co., Cincinnati, Ohio, and Reid Kennedy, president of the Monongahela Trust Company, Homestead, Pa.

Reports from the Maine shipyards indicate renewed activity in shipbuilding this season, more than the usual number of new ships being contemplated.

Court proceedings have been commenced by Henry L. Coe asking for a receiver for the Leckrone Coke Company, Uniontown, Pa.

HARDWARE.

THE problem of catalogue house competition is unquestionably one of the most serious confronting the trade, not only in Hardware but in many other lines. This method of distribution makes the catalogue house take the place of the merchants through whom in the ordinary ways the goods would reach the consumer. If the goods, as is the case with the great mass of Hardware, pass through the jobber to the retailer, the catalogue house displaces both of these distributors, while if the goods go directly from the manufacturer to the retailer, as happens frequently in many kinds of articles, the local retailer is displaced by his competitor in the great city. There is thus a disturbance of the regular course of things, as established methods of distribution are altered and new channels opened through which the goods go into the hands of the consumers.

Early in the history of this competition there was a disposition on the part of some merchants and manufacturers to pay little attention to it, and, indeed, to refrain from talking about it, as if the mention of it above a whisper would give it encouragement and tend to accelerate its progress and increase its influence. In spite of this ignoring, the system has developed and is still developing with rapidity. It is invading new departments of trade and new sections of country, and transacting a constantly increasing volume of business. The use of the most advanced business methods and the employment of practically unlimited capital have facilitated its growth. The result is that some catalogue houses buy larger quantities of certain articles than the largest jobbing houses, and their catalogues, scattered broadcast over the country, lead to the selling of goods in every State and Territory. The policy of ignoring this method of distribution has been a dismal failure. It has given opportunity for the development of the system practically unopposed.

It is time that jobbers and manufacturers, together with the retail merchants, united to consider the problem and take such action as their wisdom suggests on a matter which is full of peril for all three classes in the trade. The retail merchants and those who come immediately in contact with the competition in question have long been on the alert and deserve credit for their part in at least sounding an alarm to which little heed has been given except in a formal and perfunctory way by either jobbers or manufacturers. It is time that there be a radical change in the treatment of the problem. The new competition bears too directly on the interests of the three great classes in the trade to be permitted to pursue its methods unopposed. There should be on the part of each class a careful consideration of the practical question as to what is to be done in the face of this method of distribution. Deploring it or denouncing it will accomplish nothing. There is fortunately much that can be accomplished, and to discover the wisest course is a task for each merchant and manufacturer in view of his own immediate relations with the market. There should also be a thorough discussion of the subject by the associations of jobbers and manufacturers, following the example set by the retail merchants in this regard. This is a fitting question for the great semiannual gatherings of wholesale merchants and manufacturers, and of much greater importance to them, to say nothing of the interests of the retail merchants, than many of the questions which come before them, often only to call out profitless and wearisome platitudes. Let them grapple in a reasonable way with this subject, and they may do much for the betterment of the trade.

In this connection the letter in another column from a prominent jobbing house is noteworthy. In addition to a general discussion of the subject our correspondents make forcibly the point that it is necessary for the jobbing trade to move in this matter in self-defense, inasmuch as this new system militates directly against the jobber and threatens to be an influence which will make the maintenance of his position in the market increasingly difficult and uncertain. It is a significant consideration that the catalogue house is simply a large retailer, buying its goods directly without the intervention of any middleman. Just in proportion as this is successfully done not only does the jobber's business suffer immediate diminution, but a necessity is created for the retail merchants in towns and villages to purchase goods at prices which will enable them to compete with the catalogue house retailers of the great cities. In this way the jobber's margins threaten to be seriously narrowed, even if the retail merchants of the country are not successful in their efforts to induce the manufacturers to make them as favorable prices as they make their competitors who do a catalogue house business. The problem is thus in its ultimate bearing an exceedingly important one for the jobbing trade. This new competition has also important bearing on the manufacturers' interests, but this is a subject into which we cannot now enter. We refer especially to its relation to the jobbing trade because they are splendidly organized and are working in close harmony with the manufacturers. It is to be hoped that they will be able to discover some solution of the problem which will adequately protect their interests and at the same time those of retail merchants. It is desirable that the executive committees of the governing bodies of the great jobbers' associations give their attention to this matter, and that at the semiannual and other gatherings this subject may be considered with the care and attention which its importance demands. Mere expressions of sympathy and regret will accomplish nothing.

Condition of Trade.

The state of business is admirably reflected in the following advices from our correspondents in the trade centers. It will be noted with gratification that quite generally they report a very satisfactory demand, which keeps goods moving in good volume, while at the same time they refer to the outlook for business during the next few months as promising. After that the state of the market will obviously depend largely on the crops. Many merchants are finding it necessary to replenish their stocks, and manufacturers are consequently well supplied with orders. Indeed, in some lines they are still considerably behind in their shipments, and are receiving many requests for prompt deliveries. A few lines, as is usual at this season, are becoming scarce. In the matter of prices the market is, on the whole, reasonably steady, with a number of lines in which prices are lower than a few months ago, but these are counterbalanced by others in which prices are quite firm, and in some instances higher. This is especially the case in several lines of heavy goods in which advances have recently been made. Travelers are out in great number cultivating the trade, and their reports indicate a good feeling among the wholesale and retail merchants generally. There are some complaints of labor difficulties, actual or prospective, but the outlook for building and the uninterrupted

prosecution of business enterprises is regarded as excellent. Unless present indications are misleading, there will be an active demand for Builders' Hardware during the season, and probably during the remainder of the year, unless some disturbing influence should affect the market decidedly unfavorably. There is some complaint about collections, but the financial situation is regarded as sound and giving little ground for solicitude. The better feeling that prevails in the market is a gratifying sign that business, after a period of comparative quietude, is assuming larger volume and reflecting the continuance of prosperous conditions throughout the country.

Chicago.

As an indication of the state of the Hardware market, one large jobbing firm announce that their business for March exceeded that of any previous month in their history by nearly 25 per cent., and that business was never in as satisfactory a condition as at the present time. This sentiment is echoed with variations by other jobbers. Retailers in Chicago who have been complaining of slow business in this city say that a revival in trade has set in that is most encouraging. Syndicates and individuals are building a large number of flats and small residences, and Hardware for these buildings is being bought from the retailer, as the volume is not ordinarily sufficient to warrant negotiations with jobbers or mill representatives. Builders' Hardware is active both in Chicago and out, particularly in the West and Southwest. This is, of course, a quiet season with jobbers in Builders' Hardware, particularly as the bulk of their sales were made during January and February, preceding the advance, but the retailers are now finding a ready market for the Hardware that they bought at that time. The withdrawal of warranty on Axes and Hatchets on the part of manufacturers makes it necessary in many cases for jobbers to continue their own warranty, taking the responsibility of faulty goods on their own shoulders and losing a percentage of their apparent profits. The fact that we have had two moist, growing summers has led to so large a sale of Lawn Mowers that most of the factories are now withdrawing from the market and refusing to take further orders. Retailers' stocks are exhausted, and the ready sale which they found for Lawn Mowers during the last two years encourages them to lay in even larger stocks than before. Should a dry, warm summer follow, many of these stocks would necessarily be carried over into next year. Some difficulty is experienced by jobbers and retailers in securing prompt shipment of Wire Nails and Wire Products, both because of the overcrowded condition of the mills and on account of the freight congestion on many roads. The advance in Cut Nails is reflected in somewhat of a curtailment in volume of business. Demand for novelties which can be used by retailers to draw customers to their stores is increasing as a result, doubtless, of discussion along these lines held in the various State Hardware dealers' conventions. Hardware dealers everywhere are greatly encouraged over the success of their sale of ready mixed Paints and the volume of this trade is increasing each year. Manufacturers and jobbers state that the manner in which their country customers are reordering indicates that the present season will be an excellent one for Paint dealers.

St. Louis.

Norvell-Shapleigh Hardware Company.—Business is doing its best to be good, notwithstanding constant rains and resulting floods in a large part of our territory. If the present sunshine will just stay with us a week or ten days we will have more business than we can take care of comfortably. Sales for the first quarter have been considerably larger than last year. The declines in prices regularly promised us by a prominent trade journal for many months past have not yet materialized. Let them be patient and keep on predicting the declines, and in the course of time they can take first prize in prophecy. In the meantime we will buy goods and try to keep our stock complete.

Poor single Guns! When a man's down how the crowd will jump on him! Since your friends deserted you, you have first been made a football of in the catalogue of one house. Then another prominent jobber sells you at cost to get orders for other and more profitable Guns. In the meantime our Southern jobbing friends will discuss the question of rebates when prices decline on account of a scrap among manufacturers. Will the manufacturers of single Guns work night and day trying to fill their specifications at present prices? When a good single Gun can be retailed at $3.88, what is to become of the double Gun business?

Bolts are scarce. Everybody was afraid of Bolts. Then they advanced. Then everybody climbed on the band wagon, and the manufacturers cannot fill all the orders. Jes' so! jes' so! Barbed Wire is scarce. Cars also scarce.

A prominent manufacturer told me a few days ago he was tired of prosperity, and would be glad to see the good old hard times come again. Jes' so! Most of his goods are patented. A sales manager winked the other eye, and some Axes are being sold for shipment up to August 1. Jes' so!

There are rumors that Wire Cloth will be scarce. Prices have stiffened. But Wire Cloth is always scarce after it is all sold. Every season we have the same programme on Wire Cloth. Jes' so!

Philadelphia.

Supplee Hardware Company.—Local trade presents that featureless aspect which indicates normal, and therefore reasonably prosperous, conditions. The uncertainty of the earlier weeks of the season has disappeared before the growing certainty that there will be a scarcity of many lines of spring and summer goods, Field and Garden Tools, Wire Cloth and Netting, and other seasonable lines, demonstrating the wisdom of the merchant who placed his orders early, despite the opinion that was widespread last fall, that goods would be plenty and prices lower. How much lower no one could tell, but that there would be a very considerable drop very few were willing to doubt. Successful merchandising depends greatly on buying goods right, but too often this means getting the very lowest price, and much valuable time is lost in sparring for position. In the effort to buy at the very lowest figure orders are delayed or placed with those who are unable to fill their contracts. Experience proves that the merchant who places his business early with his jobber and depends on him to supply his wants suffers least, as the latter's self interest will take care of the prices, and a stock of seasonable goods on hand is worth considerably more than one bought (no matter how cheap) that comes in after the demand is over.

Local factories and mills, in Hardware and kindred lines, are without exception crowded with orders, and are not excusing their delay in filling orders, as formerly, by the cry of scarcity of raw material, as this seems in good supply at present, with a tendency toward higher prices, notwithstanding the increasing production, which, in the item of Pig Iron, is weekly getting back to normal figures. Many believe that the imperative demands of the railways and other large consumers will, in the next 60 days, tax the very best efforts of our mines and mills, and remove, for this year at least, the menace of a serious overproduction. As an illustration, one of our largest industries, the Baldwin Locomotive Works, received last month an order for 47 engines, for delivery in May and June. Last week this was increased 25 per cent. if delivery could be assured in June. The past winter has been so destructive to motive power that all our roads are compelled to repair and replenish to the limit of their financial ability, and many are only awaiting the successful placing of their paper to issue heavy orders for all kinds of rolling stock and materials.

Collections are well up to the mark, considering the adverse conditions in many localities, caused by floods and a decidedly backward spring.

Cleveland.

The W. Bingham Company.—Continued activity exists in the Hardware trade in Cleveland and vicinity, and in all sections from which we draw trade, and the orders coming to Cleveland jobbers make in the aggregate a very large amount of business. Customers seem disposed to

order freely for their present and future wants, but not in large quantities. They are very conservative in their orders, which is gratifying, as it enables customers to pay promptly and to get their 10-day cash discount, which at the end of the year figures a goodly sum.

We are gratified to notice from the newspaper reports that the railroad companies who have been putting off ordering necessary supplies, expecting a reduction in prices, will very soon be obliged to enter the market and buy a lot of material that they have needed for the last year or 18 months. As the reduction did not come, they must now go into the market and buy part or all of the supplies required in order to keep their equipment in proper shape. When one considers that during the years 1902 and 1903 the railroad companies consumed 60 per cent. of the steel made in the United States, and temporarily put it out of the market, and that they are now obliged to go into the market again and buy supplies, it augurs well for a large future business for the Steel mills making these lines of goods. It is reported that orders are pending which mean 30,000 new Steel cars. It is a well known fact that the railroad companies do not buy material or cars in anticipation of their wants. Every shipper knows from experience that there has been in the last year or two a lack of facilities for moving merchandise and crops. Matters for the last three months have been quiet on account of the severe weather, but now that spring is opening up merchandise of all kinds will move all over the States and better facilities must be had. It is also reported that there is a slight advance on Pig Iron—not much, 25 cents a ton—but every advance helps to stimulate business, for if there were no demand the advance would not be asked.

On the whole, the outlook for spring trade is exceedingly good, and we again urge our friends in the trade to buy, particularly the classes of goods that they know they will want for immediate and future business, and be prepared to serve their customers promptly. There has been in the last month a lively demand for Nails and Wire, and the mills have been a little slow in filling orders promptly, but just now they seem to be catching up. One thing that has operated against them, they say, is the lack of transportation facilities to get material to and away from the mill, but this is being largely overcome, and we hope for better service all around. A large amount of Wire Cloth, Netting, Lawn Mowers, Ice Cream Freezers, Step Ladders, Refrigerators and Steel goods has gone forward on early shipments, and many orders are now coming in for Axes, Cross Cut Saws, Sheet Iron, Coal Hods and Elbows for fall shipment. The trade for immediate shipment in Wringers, Galvanized Tubs and Pails and the general assortment of Carpenters' Tools is very good.

The readjustment in prices of House Trimmings has been a good thing, for some were a little too high and some were too low, and now they seem to be just about right. Take it on the whole, the advance is not very much, but it seems to be on classes of goods that could stand it. In spite of the labor troubles that have existed in some of the large cities, smaller cities, country towns and villages do not appear to have been affected this way. There will be more new buildings erected and more repairing done than had been anticipated, for these people move on in the even tenor of their way, regardless of little disturbances that seem to affect only certain localities. Our wants are many, money is fairly plentiful, and our people are going to spend it.

Baltimore.

CARLIN & FULTON.—After a winter of most extraordinary severity for this section spring is at hand (in spite of freezing weather for Easter), and in anticipation of its arrival trade is quite active, especially in the lines of Agricultural Implements, Plantation Supplies and Wire Products.

Unfortunately business is greatly hampered by unsatisfactory rail service everywhere, and the old familiar complaint of the shortage of cars is heard on all sides. Even when freight is shipped the delays in transit are beyond all shadow of excuse. There can be no valid reasons why a solid car of merchandise requiring normally three days to move a certain distance now requires three weeks. No one believes that the business of the country has developed within the last two or three years so suddenly that the railroads find themselves completely paralyzed for lack of motive power, and if they are in this condition there is undoubtedly gross mismanagement somewhere.

The boards of trade in the different States should investigate the matter and see whether there is not a remedy. Let a car remain at a terminal one day longer than the railroad wishes and a penalty is imposed in the shape of a demurrage charge, but incompetency or something else can detain a car two weeks in transit and neither shipper nor consignee has any redress.

The trade by this time have no doubt been advised of the latest advances in prices made by the associated Axe and Hatchet manufacturers. At present the manufacturers of these lines have it all their own way. Whether they will make the wisest use of their opportunities remains to be seen.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—Local interest at present centers on the flood situation through the Western country. After suffering a protracted drought of months, in which time the deficit, according to the Government gauges, amounted to 12 or 15 inches, we have lately been treated to an extra downpour, and White River and Green River and Blue River, to say nothing of the raging Wabash, with all other minor tributaries to the great streams, have contributed a deluge which ordinary channels are not sufficient to carry off. Railroads have been seriously interfered with, mails and freight are delayed, and main efforts being made to hold down the bridges and graded tracks. With all this, however, there has been a good, seasonable market for supplies, with more difficulty than usual experienced in securing shipment of them. The old fashioned way of the factories carrying stock has been abandoned, and nothing is made up unless it is actually ordered, and then sometimes six months back. We have just received an extra friendly letter from a correspondent of ours who makes tools in reference to an order placed last October. He says: "We now hope to ship your order by the middle of May if we have good luck."

Hardware into which timber enters is high and deliveries are slow. There is no doubt about it that hard wood has been difficult to secure, and what good is the best of tools without the handle? The rolling mills declare themselves to be well supplied with orders, particularly those which make bar iron. With seasonable weather we have no doubt of unusually good trade.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The spring trade continues to be entirely satisfactory in all deparments; business shows a considerable increase over last year at this time. The movement of Refrigerators, Freezers, Water Coolers, Hammocks, Wire Cloth and other summer goods is very heavy, and there promises to be a scarcity of these articles. A number of the traveling men are now taking some handsome orders for future shipment for fall and winter goods. Such lines as Cutlery, Guns, Heating Stoves and Stove Pipe are being bought liberally. Trade in Axes is very light and no future orders are being placed in this line, probably due to the advance in prices. The recent stiffening in the Pig Iron market has had a wholesome effect on the Hardware business and prices are being well maintained. While collections are hardly in keeping with the sales, they are fairly good.

San Francisco.

PACIFIC HARDWARE & STEEL COMPANY.—Although from our own experience we would have no right to complain, it is no doubt true that the very wet weather of the last several weeks has seriously affected the retail business. This is true not only in our own locality and our own State, but is generally true of the entire Pacific Coast. We have had not only an exceptionally long continuous series of rains, but a very heavy rainfall in rather a limited space of time. In parts of the country roads

are impassable, rivers cannot be forded and even bridges are pronounced dangerous. Experience has taught us in the past that while a limited section can be damaged by excessive water, the general good is hardly to be measured; so that while conditions in the immediate past have not been altogether satisfactory, either as to volume of business or payments, we are quite satisfied that the immediate future gives us hopes for as good a spring season as we have ever enjoyed.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—The general situation remains practically the same as outlined in our preceding reports. The country demand for Hardware and kindred goods continues to be quite active, and with the open season close at hand it is expected that a large business will develop suddenly and push the capacity of the jobbing trade to the utmost. Some lines of staple and seasonable goods are somewhat scarce, and it is difficult to obtain prompt shipments from manufacturers, many of whom claim they are away behind on their orders; otherwise the market is featureless.

Indications point to a heavy business in Builders' Hardware and Mechanics' Tools as soon as the weather permits outdoor operations. It is a matter of fact that more new enterprises have already started this season, with others under contemplation, than have developed in several years past. This applies to Omaha as well as to the territory tributary, and indicates assurances that general business conditions will be about as satisfactory as could be desired.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—There is no improvement in the weather in this section, and, consequently, no improvement in trade. It is years since the Pacific Northwest has experienced such an opening of a year as January, February and March have brought us. Farmers are unable, as yet, to do any plowing, as the ground is so thoroughly soaked, and rain is still falling at intervals, so that it is hard to say when they will be able to do any seeding. When the rain does cease the farmer will be so busy for six weeks that he will have no time to do any trading, throwing spring business over into the summer.

Lumber selling at $5 per 1000 less than a year ago and 157 saw mills in the Pacific Northwest shut down, endeavoring to get a 40-cent rate on Lumber by rail to Missouri River, while railroad managers are striving to get higher rates to offset increased operating expenses and a less volume of freight offering, bodes ill for the mills, and therefore reflects on the Hardware trade, as the lumber business offers us one of the best avenues for marketing a large line of goods that we have. Collections have not been worse since the panic of 1893 than they are this spring.

NOTES ON PRICES.

Wire Nails.—The mills welcome a perceptible cessation in the rush of orders which has characterized the market for some time. The demand has been so heavy and cars so scarce that manufacturers have fallen behind in making shipments. A less active demand will afford an opportunity to mills to catch up with back orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95
Retailers, less than carload lots	2.05

New York.—Demand for small lots from store by local merchants is light, but from the trade in adjacent territory is much heavier. Quotations are as follows: Single carloads, $2.10; small lots from store, $2.20.

Chicago, by Telegraph.—Monday's fire at the Rankin plant of the American Steel & Wire Company was unfortunate because it interrupted the manufacture and shipment of Nails at a time when the minutes are precious. It will require the full capacity of every operating Nail mill to supply the demand for Wire Nails this season. Quotations are as follows: Carload lots to jobbers, $2.10 per 100 pounds; less than carloads to jobbers, $2.15 per 100 pounds; carloads to retailers, $2.15 per 100 pounds; less than carloads to retailers, $2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—We can state officially that the fire at the Rankin Works of the American Steel & Wire Company will not interfere in any way with the filling of orders, as these will be taken care of from other plants. Demand for Wire Nails is not as active as it was two or three weeks ago, but the mills rather welcome this, as it will give them a chance to catch up with back orders, on which they are very much behind, owing to scarcity of cars and heavy demand for Nails. The tone of the market is very firm. We quote Wire Nails at $1.90 in carloads to jobbers, $1.95 in carloads to retailers and $2 to $2.05 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—Mills are not generally accumulating stocks, as demand is about equal to production. The scarcity of cars is interfering somewhat with prompt shipments. Quotations are as follows for Steel and Iron Nails, in all quarters: $1.75, base, in carloads, and $1.80 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Labor troubles are responsible for a limited demand in this city, while from surrounding territory demand is better. Some trouble is experienced in obtaining prompt shipments from mills. Quotations are as follows: Carloads on dock, $1.89½; less than carloads on dock, $1.97½; small lots from store, $2.05.

Chicago, by Telegraph.—There seems to be a tendency among some large contractors who study into the minutest details of their operations to favor the Cut Nail as against the Wire Nail for many purposes. It is well known that the Government always has favored the Cut Nail, and Government specifications usually insist upon Cut Nails. The volume of trade in Cut Nails in the Chicago market is not large as compared with Wire Nails, although it is large in the aggregate, and the demand seems to be slightly increasing. Prices on both Iron and Steel Nails are as follows: Carload lots, Chicago, to jobbers, $1.91½, base; less than carloads, $1.96½. Retailers and large consumers pay 10 cents per 100 pounds above jobbers' prices. Jobbers sell at from $2.10 to $2.30, base, f.o.b. Chicago warehouse, according to customer, size of order, &c.

Pittsburgh.—We note a moderate demand for Cut Nails, and the output of the mills is taken about as fast as made. A few of the mills are somewhat behind in shipments, owing to scarcity of cars. Prices in connection with the recent advance of 5 cents per keg are being firmly held. We quote Steel and Iron Cut Nails at $1.75, base, in carload lots, and $1.80 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Large buyers have generally placed their contract orders, so that demand is not so great as during the past month or two. Shipments on orders already taken are being urged, but scarcity of cars and Steel retards the desired movement to some extent. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago, by Telegraph.—There is no let up in the demand for Barb Wire. The Government will buy through its Indian warehouses at Chicago, St. Louis, Omaha and St. Paul 308,000 pounds of Cattle Fence Wire, two-point Barbed, Galvanized, main Wires not larger than 12½ guage, barbs not larger than 13½ guage, space between barbs not to exceed 5 inches, together with 6500 pounds of Staples. Bids will be closed April 18. Besides these, large purchases will be made by the Government for the Philippines. Prices remain unchanged, as follows: Carload lots, Painted Wire, $2.40; Galvanized, $2.70; to retailers, carload lots, Painted, $2.45; Galvanized, $2.75; to retailers, less than carload lots, Painted, $2.55; Galvanized, $2.85; Staples to jobbers, $2.25 for Plain and $2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—Demand for Barb Wire has fallen off to

some extent, as most of the large buyers have placed their contracts and are now urging shipments on same. The mills are somewhat behind in orders, owing to scarcity of cars and also of Steel, a supply of which it has not always been possible to obtain promptly. Prices are firm, but without change. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads	$2.20	$2.50
Retailers, carloads	2.25	2.55
Less than carloads	2.35	2.65

Smooth Fence Wire.—Mills have not yet caught up with their orders, and will not be able to do so for some time to come. Demand is in good volume, but not so large as it has been. A majority of the large contracts have been placed, but scarcity of cars retards shipments. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.80
Retailers, carloads	1.85
Less than carloads	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago, by Telegraph.—The output of this product this year will be phenomenal, and would be larger were it not for the inability of the mills to keep pace with the demand for Wire. Prices remain as follows: Smooth Fence Wire, sizes 6 to 9, $2 per 100 pounds in carload lots to jobbers, f.o.b. Chicago; $2.05 per 100 pounds to retailers in carload lots and $2.10 in less than car lots.

Pittsburgh.—Demand is still large, but not as heavy as two or three weeks ago, most of the large contracts having been placed. The mills are still away behind in orders because of scarcity of cars. It will take the next several months before the mills have caught up with back orders. Prices are firm, but without change. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, $1.80, base, for Nos. 6 to 9, in carloads to jobbers, and $1.95 to $2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Sheet Zinc.—Under date of March 31 an advance is announced in the price of Sheet Zinc by Matthiessen & Hegeler Zinc Company, La Salle, Ill., the present quotation being $6.10 per 100 pounds in 600-pound casks, f.o.b. La Salle, with the usual discounts on quantities.

Chain.—A meeting of the principal Chain manufacturers of the United States was held in Pittsburgh last week, at which the conditions of trade were thoroughly discussed. Prices on Chain have been open for some time, and in view of the fairly active demand and the general betterment in the trade situation it was deemed advisable to adopt uniform prices on Coil Chain, Trace Chain, &c., which was done. The new prices are believed to be conservative, and are very little higher on most grades than when the market was open. The manufacturers have adopted a system of delivered prices which, it is understood, will be adhered to in all cases.

Iron Rivets.—The manufacturers of Iron Rivets have recently adopted advanced prices, which went into effect April 1. The advance is about 5 per cent. The market in this line is regarded as in an excellent condition, with a good volume of business.

Double Pointed Tacks.—This is one of the Hardware lines which is in an unsatisfactory condition so far as prices are concerned. There is a good deal of irregularity in quotations, which are referred to by the manufacturers as unprofitably low.

Carriage Bolts, Machine Bolts, &c.—There has been within the past month or two a marked increase in the demand for Carriage Bolts, Machine Bolts, &c., and most of the manufacturers are fully occupied with orders. The trade have been somewhat surprised at the firmness with which recent advanced prices have been maintained. The tone of the market continues excellent.

Nuts.—The recent advances in Nuts are firmly adhered to. Manufacturers generally report a large volume of business.

Heavy Hammers.—An advance of about 5 per cent. has recently been made in this line, and manufacturers are maintaining firmly the new prices.

Picks and Mattocks.—While there has been no formal advance in Picks and Mattocks, there has been a withdrawal of some of the extreme discounts, and the market is more regular and slightly higher than it has been.

Paris Green.—Present demand is light, as merchants have not been obliged to send in duplicate orders. Market conditions are unchanged, and the base quotation of 11 cents in Arsenic kegs or casks, is general. Most manufacturers are asking the customary advances, but some are naming less than the regular advances on the smaller packages.

Cordage.—Orders received by manufacturers are generally fair in volume, while some report a satisfactory business. The price for large lots of Pure Manila Rope is sometimes shaded from ¼ to ½ cent below the following quotations. Sisal Rope appears to be steady in price. Quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 12 cents per pound, with a rebate of ¼ to ½ cent per pound to largest buyers; other grades of Manila, 10 to 11 cents, according to quality; pure Sisal, 9¼ cents, with ¼ cent rebate to largest buyers; Mixed Sisal, 8 cents per pound, with no rebate.

Glass.—Continued dullness in Window Glass has been prominent during the week. Jobbers do not seem willing to place orders for more than current demands, owing to the agitation which is kept up by workers regarding the wage scale. Manufacturers who are financially able to hold their Glass are not soliciting business at prices which are being made by those who are forced to dispose of their product as fast as made. The production of Glass during the present fire has at no time been normal, which leads to a prediction of a shortage in supply this summer. At factory, prices range from 90 to 90 and 5 or 90 and 10 per cent. discount for carload lots, according to the necessity of the manufacturer to dispose of his output.

Paints and Colors.—*Leads.*—The volume of trade since the first of the year has been light from the local trade, owing to unfavorable weather and the unsettled conditions in labor circles. Contract orders from nearby points have been placed and drawn upon, while current orders have been fair. Manufacturers are expecting an increase in demand from surrounding territory with a continuance of pleasant weather. Quotations are as follows: Lots of 500 pounds or over, 6½ cents; in lots of less than 500 pounds, 7 cents per pound. Less favorably known brands are quoted at ½ cent per pound less than the foregoing figures.

Oils.—*Linseed Oil.*—There is an improvement in demand for small lots from out of town points, but new business from the city trade is light. Contract orders are being drawn upon as requirements demand. With continued pleasant weather and settlement of labor troubles an improvement in buying is expected. Quotations are as follows: City Raw, in lots of five barrels or more, 42 cents; in lots of less than five barrels, 43 cents per gallon; State and Western Raw, 39 to 40 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—The week under review has been devoid of large transactions, and prices have eased off 1½ cents per gallon. Demand at Savannah is very light, while at this point only small lots are changing hands. Stocks in the South are reported as quite large, and new crop receipts as being received. Quotations, according to quantity, in this city, are as follows: Oil barrels, 57½ to 58 cents; machine made barrels, 58 to 58½ cents.

Union Implement & Hardware Company, Independence, Kan., have been incorporated with a capital stock of $20,000. They are successors to Union Implement Company and handle Shelf Hardware, Stoves, Tinware, Paints and Oils and Sporting Goods, in addition to Implements.

Correspondence.

CATALOGUE HOUSE COMPETITION.

Letter from Norvell-Shapleigh Hardware Company.

St. Louis, March 31, 1904.

To the Editor: A catalogue house in Chicago selling direct to consumers has recently issued a decidedly interesting catalogue. It is offered for sale at 50 cents per copy—it is well worth the price. Every Hardware, Cutlery and Sporting Goods manufacturer, every jobber and every retailer should secure a copy of this catalogue and carefully study its contents. This house do not seek the business of dealers; their business is derived directly from consumers. They do a strictly retail business—cash in advance. They break boxes. They will sell a single item of anything in their line.

We suggest you mark up this book with your cost and selling price opposite each item where it is possible to make comparisons. On many lines the manufacturers' names are plainly stated; the proper numbers and description of the goods are entered. Among them are some of the best known in the country. Some of these manufacturers are represented by only a few of their most staple goods; in other cases almost their entire line is catalogued. There is an effort on some lines to disguise the goods by using fictitious names. Where no names at all are given many goods are to be recognized by their numbers, description or by the cuts used. Almost everything in the Hardware line is offered for sale from Axes to Zinc.

A careful study of the prices entered on standard goods leads to the conclusion that if a jobber adds a fair profit on these goods in selling the retailer and if the retailer adds a reasonable profit in selling the consumer it is impossible for the retailer to profitably compete with this catalogue house. In making these statements please bear in mind we are referring to those goods that are sold openly under manufacturers' names; they do not refer to other goods disguised by fictitious names. It is evident that these well-known manufacturers' lines are used as drawing cards. The consumer who studies the catalogue is expected to judge all the prices in the line by those quoted on these old established brands.

This question of catalogue house competition some may think is an old story, but we wish to ask the Hardware jobbers and retailers who read this article—especially the larger jobbers and more especially the heads of these larger jobbing houses—How thoroughly have you yourself studied these catalogues? How much serious thought have you given this subject? This letter is written not with the idea of presenting anything new, but in the hope of more forcibly emphasizing the questions involved with the men who control the affairs of the leading jobbers and retailers of the country.

We have before us to-day three systems of distributing merchandise:

1. The old and established system of manufacturers supplying jobbers, jobbers supplying retailers, and retailers supplying consumers.
2. The system that has developed in recent years of manufacturers supplying catalogue houses and catalogue houses supplying consumers.
3. The still more recent system, which so far is limited to a few lines, of manufacturers supplying consumers direct.

In the first system the manufacturer, the jobber and the retailer each derives a profit. In the second system the jobber and the retailer are eliminated, the catalogue house taking the place of both jobber and retailer. In the third system all parties to the transaction are eliminated except the manufacturer and the consumer.

Speaking broadly, we believe we are safe in claiming that the manufactures of this country have been built up on the business of the jobbers; the jobbers in turn have derived their support from the patronage of the retail dealers; the retail dealers in turn have lived upon the business of the consumers of the community. Granting these facts as being generally true, the whole matter simmers down to a question as to which system of distribution must obtain in the future. If the jobber and the retailer are finally eliminated, the next question to arise will naturally be the elimination of the catalogue house by the manufacturers selling direct to the consumer; but that is too far in the future to concern us at present.

The systems of distribution by the catalogue house and the distribution by jobbers and retailers are antagonistic and at war wtih each other. Either one or the other must survive; the two systems cannot flourish side by side in the sale of the same lines of goods. It is not a question of right or wrong. The catalogue house has just as much right to buy goods and sell them as the jobber or the retailer. Their business is just as honorable as ours, and we think all questions of their right, of their honesty, &c., &c., should be entirely eliminated from a fair and impartial discussion of the principles at issue.

It seems to us in this case the jobbers and retailers are in the same position as a nation whose territory has been invaded by an enemy. Shall they quietly and cheerfully allow this enemy not only to absorb their territory, but complacently look on while he grows stronger from the revenues of their territory that he has already acquired? It strikes us it is high time for the jobbers and the retailers to devise some plan to drive these invaders from within the borders of their country. This is a question where the interests of the jobber and the retailer are identical; it is a common ground on which they can and should work in harmony.

If many of the leading manufacturers of the country have decided to continue their present policy of selling to and encouraging the development of catalogue houses this system of selling goods will, of course, increase. Unless these manufacturers can be convinced that it is not to their interest to sell such houses, those already in the business will not only increase in power, but other houses of the same nature will be established in all the larger trade centers of the United States. Then when the number of these houses largely increases naturally competition between them will be greater, and as a result goods will be sold on still closer margins. When they are sufficiently powerful the parcel post will follow. We already have the rural free delivery. Now imagine the condition of the retail dealer when every farmer and mechanic in the land will be liberally supplied with these catalogues and can order what he wants and have it delivered at his door by the Post Office Department in lots of 25 or 50 pounds at a time! It would seem to the most casual observer that such a system would mean not only the elimination of the retail dealer, but the practical depopulation of our present flourishing small cities and towns and the building up of great congested trade centers.

The jobber, of course, could escape the fate of the retail dealer by discharging his salesmen and turning his organization into a catalogue house, going direct to the consumer for his business.

These catalogue houses in their infancy bought goods from the jobbers; the jobbers were short-sighted in selling them. Just as soon, however, as their purchases reached respectable proportions they went to the manufacturers. To-day the quantity of goods sold by the jobbers to these catalogue houses cuts very little figure in the volume of a jobber's business. The jobber cannot sell them, because the manufacturers have placed such houses on the same basis and in some cases upon a lower basis than the jobbers themselves. In the beginning these houses used the jobbers as a convenience; the jobbers were satisfied with the present, not considering the future. It is a matter of record that such houses now control the output of manufacturers or even own these factories themselves. Therefore, the manufacturers have in a number of instances suffered the fate of the jobbers.

A study of this catalogue brings to our minds a number of interesting questions. One of the most prominent of them is suggested by the prices entered on certain well-known brands of Edge Tools. These prices are about the same as the jobber is bound by this manufacturer to sell the same Tool to the retail dealer. Please note this carefully. This manufacturer's Tools are entered in the catalogue under his own name, and the price opposite the

Tool is practically the same as this manufacturer insists upon the jobber maintaining in selling the retailer. Truly a remarkable state of affairs! We are told that 98 per cent. of the output of this line of goods is controlled by one selling arrangement. Therefore, the usual excuse that if they did not sell these goods to the catalogue house some other manufacturer would hardly holds good. It is also to be noted that while the jobber on this line is positively prohibited from warranting them this catalogue house come out in great headlines selling these goods under a warrant. They sell the goods to the consumer at exactly the same price the jobber is permitted to sell them to the retailer; they sell them under the manufacturer's own brands; they sell them on a warrant, while the jobber is not allowed to do so. Ye gods and little fishes!

There are other lines in this catalogue, not only in Hardware but also in Sporting Goods, on which the difference between the prices the manufacturers have established for the jobber to sell the retailer and the prices entered in the catalogue is so slight that it would not pay the freight on the goods.

All of us must admit that the jobber is under some obligations to his retail customer. His success and prosperity depend upon him. Now any manufacturer who permits his goods to be entered in this catalogue at such prices evidently has forgotten all about the interests of the retail dealer. The jobber has been taken care of, but no one seems to have considered the interests of the retail dealer. The jobber is between two fires: On one side the manufacturer asks him to maintain certain fixed selling prices to the retail trade. If the jobber maintains these prices, then he cannot sell the retail dealer at prices which will permit his customer—the retailer—to compete with the catalogue house. Therefore it follows as a natural result that the retailer will lose the business and it will be taken by the catalogue house. The question I wish to propound is, Where does the jobber's greatest obligation lie? Is it to the manufacturer from whom he buys his goods or to the retail dealer from whom he derives his support?

When a manufacturer sells a catalogue house his own brands of goods under his own name he does not increase the consumption of these goods. If a demand is established on these lines the goods will be called for, and if the catalogue house did not get the business it would be secured by the retailer, and the goods would be supplied by the jobber. Catalogue houses do not create a demand for goods; the demand has been created by others, and they take the business by underselling the retailer. The manufacturer in selling the catalogue house simply changes the channel of trade. Many of the articles shown in the catalogue under review are patented; they can only be obtained from one manufacturer. All the business this manufacturer obtains from the catalogue house is not new business, it is not created business, but simply business which has been diverted from the retail dealer and the jobber. Why should the manufacturer prefer to sell these goods to the catalogue house instead of to the jobber? Why should it be his preference to divert a certain amount of this business from the usual channels? How can such a manufacturer claim to be friendly to the jobber and to the retail dealer and to have their interests at heart when he deliberately, by his example and influence, encourages a system that menaces the very existence of the jobbing and retail interests? How can he in reason and in fairness expect jobbers and retailers to feel friendly toward him and his goods when he follows this course?

We have read in the trade papers of the proceedings of the National Jobbers' Association. We have read of the numerous meetings of the retail Hardware dealers' associations. Nevertheless, immediately following all these meetings we have before us this catalogue in which the line of goods shown is more varied and extensive than ever before, and in which the prices, we believe, are more radical. The jobbers' and retailers' associations up to this time, judging from this catalogue, have not made any deep impression upon the minds of a number of manufacturers whose names and goods appear so prominently in this catalogue. It seems to the writer they have lost force and strength by scattering their efforts among too many issues.

The question should be, What is the greatest issue today before the jobbers and retailers? In our opinion it is "catalogue house competition." Then, if this is the greatest question, why cannot the jobbers and retailers, in defense of their mutual interests, come together on this one issue? Jobbers and retailers may differ among themselves in regard to many matters, but we believe this is one issue upon which we can all unite.

This article is written under the name of this company. There may be answers. There are two sides to every question. It is only fair that any answers should be properly signed so we will know their authors. We remember some time ago a discussion in these columns in regard to Special Brands, where one house wrote all its articles over its own name, while all the answers were anonymous, which, of course, was hardly a square deal.

NORVELL-SHAPLEIGH HARDWARE COMPANY.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Levying Contributions from Jobbers and Manufacturers.

FROM A JOBBING HOUSE.—In your issue of March 31 you refer to the well-known habit of retail merchants in the smaller towns calling upon their jobbing houses, both directly and by furnishing the names to local people, for contributions to all sorts of objects. Your closing remark is this: "Parties receiving such appeals, after calling their customer's attention to the impropriety of his part in the transaction, would naturally consign the circular to the waste backet."

That is exactly the way such matters should be treated, but unfortunately for the wholesaler is not the way it is done. This practice has grown to such an extent that we venture the assertion that all wholesalers receive such appeals in one form or another almost daily, and in the course of time from almost every town where they have customers. There is not a church built, a fair held, a fire equipment installed or a G. A. R. entertainment that is not brought to the attention of the jobber with a hint that his generosity will not be forgotten by his customer. Now, this reduces the affair to a "hold up," or a tax, which the jobber cannot ignore, or, if he does, he risks losing the good will of his customer. The result is that he turns to his ledger to see the amount of the account of the merchant making the "request," and sends his check accordingly. Although a "Charity and Donation" account is carried, most of the charges against it should rather be charged to "Customers' Tax for their Home Charities."

As business is done the customer expects to buy his goods at the lowest possible price, and should do so. When that is done and the money paid, the duty of both sides is fulfilled, and neither has a claim on the other. All such shameless transferring of the calls of charity in one locality from the local merchant to his wholesaler should be frowned upon by right thinking people. Charity is too noble a quality to be degraded by such practices. It should be without purpose or wish for any other reward than an approving conscience. Where there is any claim in a charitable way upon the merchants of the cities, such as an epidemic or public calamity which the locality cannot handle itself, then the wholesale houses are glad to send their contributions as soon as the facts are known, but they cannot look upon these "hold ups" as contributions to charity.

Shortage in Glass.

FROM A HARDWARE MERCHANT IN TENNESSEE.—We should like through your paper to call the attention of the trade to the fact that some of the Glass factories are packing Glass short—that is, not putting 50 square feet in a box. For example: One box of 22 x 42 inches, D. S. A Glass contains seven lights when there should have

been eight. A careful inspection satisfied us that the Glass had been packed at the factory one light short. Several boxes of smaller size were two to four lights short.

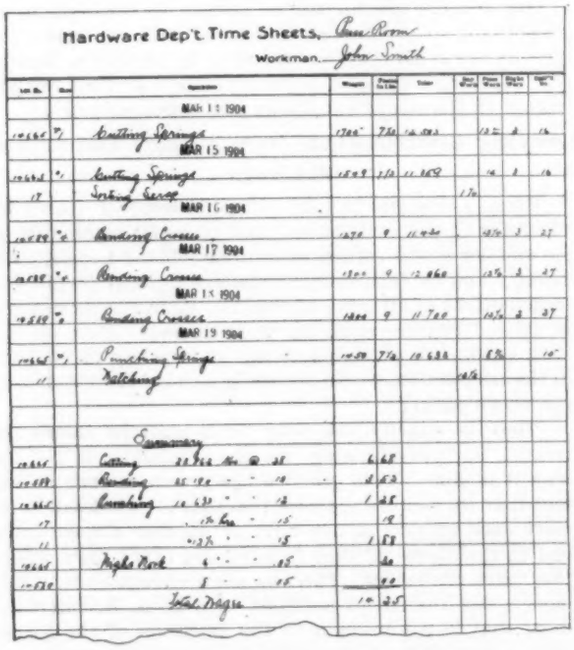
FACTORY COST AND BUSINESS METHODS.

COST SYSTEM USED BY THE ONEIDA COMMUNITY IN ITS HARDWARE FACTORY.

BY G. W. NOYES.

PART I.

THE Oneida Community operates four factories, each manufacturing an entirely distinct line of goods. No one of the factories, taken by itself, is large enough to warrant a cost system of the most elaborate type.


Hardware Dep't Time Sheets. Pen Room
Workman. John Smith

Lot No.	Size	Operation	Wages	Pieces or Lbs.	Time	Rate	Gross Wages	Night Work	Dept. No.
		MAR 14 1904							
10686	7/	Knitting Springs	1700	7½	10 083		12	2	14
		MAR 15 1904							
10684	"	Knitting Springs	1009	1½	11 169		14	2	16
17		Forking Springs				17½			
		MAR 16 1904							
10688	"2	Bending Corners	1270	9	11 040		15½	2	27
		MAR 17 1904							
10688	"2	Bending Corners	1300	9	12 060		15½	2	27
		MAR 18 1904							
10688	"2	Bending Corners	1800	9	11 700		14½	2	27
		MAR 19 1904							
10686	"7	Punching Springs	1009	7½	10 688		13½		16
11		Matching					18½		
		Summary							
10686		Cutting 22 7/32 Ms @ 25		6	62				
10688		Bending 25 192 " " 19		4	63				
10686		Punching 12 630 " " 13		1	95				
17		" 12 630 " " 15			79				
11		" 4 275 " " 15		1	58				
10686		Night Work 4 " " 25			40				
10688		" 5 " " 18			90				
		Total Wages		14	25				

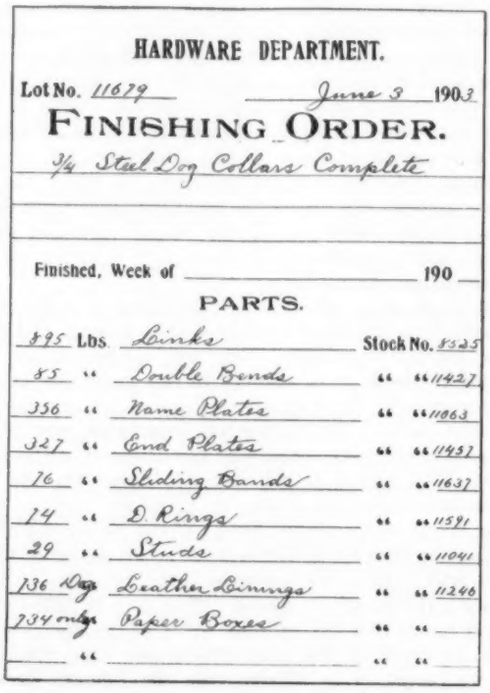
Fig. 1.—Time Sheets, Measuring 8¾ x 10 Inches.

Several years ago a comparatively simple system was devised, which, variously adapted to the different factories, has been productive of excellent results. A description of the system as applied in the Hardware factory follows:

The Hardware factory employs about 200 hands, and is engaged in the manufacture of Animal Traps, Coil Chain, Halter Chains, Cow Ties, and other similar articles made from sheet steel and steel wire. From the standpoint of cost determination, the chief difficulty is the multiplicity of small parts, and incomplete combinations of parts, which enter into the finished product. An examination of the cost cabinet shows that there are about 1500 parts and combinations of parts, all manufactured in the shop, the cost of which must be determined before the cost of the completed articles can be ascertained.

DATA REQUIRED FROM FACTORY.

Every part, every combination of parts, which represents a distinct stage of assembling, and every completed article, is manufactured in separate lots. Each lot is identified by a lot number, which follows it until completion. To assist in the identification of partly manufactured stock, cards containing the lot number are placed in each barrel or tray. A number of timekeepers are distributed through the shop, whose duty it is to keep track of all piece work and time work, charging it to the proper lot numbers, to weigh the stock used for each lot, and weigh or count the finished product. Fig. 1 shows the printed form used by the timekeepers in analyzing the wages. These "Time Sheets" are the original wages record, and from them the payroll is made out. After serving for the payroll, they are forwarded to the Cost Department, and summarized according to lot number, as explained below in the paragraph on wages. In dividing the wages among the various lots worked on the timekeepers obtain their data partly by direct observation and partly by questioning the workmen. A "Job Ticket," the front and back of which are shown in Figs. 2 and 3, accompanies each manufacturing order, passing from one timekeeper to the next as the job advances through the


HARDWARE DEPARTMENT.

Lot No. 11629 June 3 1903

FINISHING ORDER.

¾ Steel Dog Collars Complete

Finished, Week of _____ 190__

PARTS.

895 Lbs.	Links	Stock No.	8325
85 "	Double Bends	" "	11427
336 "	Name Plates	" "	11063
327 "	End Plates	" "	11457
76 "	Sliding Bands	" "	11637
74 "	D Rings	" "	11591
29 "	Studs	" "	11041
136 Doz	Leather Linings	" "	11246
734 only	Paper Boxes	" "	
	"	" "	

Fig. 2.—Front of Job Ticket, Measuring 4½ x 6½ Inches.

shop, and at the end of each week the Job Tickets belonging to completed lots are sent to the Cost Department.

ANALYSIS OF EXPENSE ACCOUNT.

At the close of each month the expense account is analyzed and drawn off on a printed form, called the Expense Summary, shown in Fig. 4. The Expense Summary is posted to a card ledger, by means of which the expense analysis is thrown into a cumulative form. Besides containing much valuable information, this Analysis Ledger is made use of for a special purpose, which will be explained further on. The fundamental feature

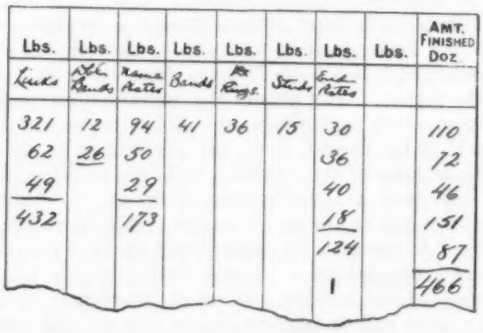

Lbs. Links	Lbs. ¾in Bands	Lbs. Name Plates	Lbs. Bands	Lbs. D Rings	Lbs. Studs	Lbs. End Plates	Lbs.	Amt. Finished Doz
321	12	94	41	36	15	30		110
62	26	50				36		72
49		29				40		46
432		173				18		151
						124		87
						1		466

Fig. 3.—Back of Job Ticket.

of the Expense Summary is the arrangement of columns, by which the entire expense of the month is classified under the following heads:

a. ADDITIONS TO PLANT.
b. STOCK.
c. WAGES.
d. OPERATING EXPENSES.
e. MAINTENANCE OF PLANT.
f. SELLING EXPENSES.
g. MISCELLANEOUS.

Expenses for Additions to Plant involve two factors, which are properly chargeable to cost of production—viz., depreciation and interest. In the system a charge for de-

preciation is included in the column headed Maintenance of Plant, and all interest actually paid on borrowed capital is charged under Operating Expenses. Hence the items classified as Additions to Plant, consisting solely of expenditures for such additions as are inventoriable at full valuation, are not charged against the manufacturing costs. In the column headed Miscellaneous appear such items as are entirely irrelevant to the costs. Selling Expenses are not included with the factory costs, but receive special treatment, which will be explained in a separate paragraph.

(To be continued.)

TRADE ITEMS.

THE COLT'S PATENT FIRE ARMS MFG. COMPANY, Hartford, Conn., have acquired the exclusive American rights to manufacture and sell the Vickers-Maxim Automatic Machine Guns. The Colt Company state that it will not be necessary for the present to add new manufacturing space to their plant. A recent rearrangement of the armories concentrates the departments so that a considerable floor area is available for this important additional line.

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn., John H. Graham & Co., 113 Chambers street, New York, direct representatives, have adopted a clever advertising scheme in connection with their New Departure Coaster Brake, Bicycle Bells, Cyclometers and Cycle Sundries. To the dealer they send a printed form of queries relating to their goods, with space below for the names of bicycle riders in their neighborhood, in consideration of which on return of list, with at least 25 names and addresses, they send the merchant a handsome fob made of alligator skin, the trimmings of which are bronze, finished in oxidized silver, Roman gold and other high grade finishes.

J. H. GRAHAM & Co., 113 Chambers street, New York, manufacturers' direct representatives, have for several weeks been rearranging and renovating their office floor for the purpose of bettering and increasing their facilities for the more expeditious transaction of business. A marked feature of the thorough overhauling is the installation of 13 large double oak sample cases with glass doors above and cupboards beneath, the latter being intended for the more bulky samples, such as Ice Cream Freezers, Wood Goods, &c., which it would be impossible to sample on a board, and a supply of circulars and other trade literature. The desks have been readjusted and more advantageously placed, the walls tinted in light colors and the entire plan changed for the better.

H. O. SPENCER, treasurer of the Richards Mfg. Company, Aurora, Ill., who manufacture Door Hangers and Hardware Specialties, is now in New York, arranging for direct representation here and the carrying of a stock and line of samples in the immediate future. This will put them in closer touch with the trade in Eastern territory and insure quick deliveries for hurry orders.

CLENDENIN BROS., Baltimore, Md., issue a postal circular, under date April 1, in which they announce that their office and warehouses are now located at Thames and Caroline streets, where they have ample storage and a complete assortment of goods for immediate delivery. All cars are loaded at their doors, while water routes are also nearby.

THE BRIDGEPORT GUN IMPLEMENT COMPANY, Bridgeport, Conn., have sold their Golf and Tennis Goods business to a new corporation, known as the Bridgeport Athletic Mfg. Company. The Gun Implement Company plan to confine themselves to their regular line. They added the line of Golf Goods five years ago and that of Tennis Goods three years ago. The Bridgeport Athletic Mfg. Company have an authorized capital stock of $500,000. Hector M. Delano is the president and Henry C. Jenkins the secretary. They have established an office at 311 Broadway, New York. The location of the manufacturing headquarters has not been determined.

A RECENT general letter of the Norvell-Shapleigh Hardware Company, St. Louis, to their traveling salesmen contains the photographs and names of 28 salesmen, and the names only of nine more who during January and February sold complete stocks of Hardware to new firms. Forty-seven new stocks were sold by these 37 salesmen.

IN addition to other products which are intended principally for domestic trade Hopkins & Allen Arms Company, Norwich, Conn., make the XL brand of solid frame Revolvers, which are largely sold for export. Their line of Fire Arms is especially complete, including as it does Double and Single Barrel Shotguns, Revolvers of the automatic style in both hammer and hammerless patterns, blued or nickel plated, and Rifles.

Felix Manier has bought the Hardware business of I. N. Woodcox, 38 Valley street, Dayton, Ohio, and will continue at the old stand.

HARDWARE EXPENSE SUMMARY.

STOCK	OPERATING EXPENSES	MAINTENANCE OF PLANT	SELLING	MISCELLANEOUS
Acid	Accidents	Boilers	Advertising	Allowances
Aluminum	Barrel Brass	Belting	Agents	Cost from P. R.
Barrels	Boiler Expenses	Belt Lacers, etc	Bad Accounts	Chgs. to Error
Brass for Chains	Coal—Boiler	Bldgs.—Repairs	Catalogues	Jobs
Copper—Chain	Coal—Forge	Depreciation	Electrotypes	Sales
Dog Collar Linings	Coal—Furnace	Dies	Misc. Selling	Suppose for rad.
Hex Bolts	Coke	Elec. Lt.—Repairs	Patents	
Fct. & Ex. Stock	Doctor's Bills	Files	Samples	
Hooks	Fct. & Exp. Gen.	Fire Brick		
Iron, Blacksmith	Gloves and Mitts	Foundry Facing		
Japan	Grinding Materials	Furniture		
Labels	Interest	Iron—Blacksmith		
Malleable Iron	Kindling Wood	Lumber—Repairs		
Nickel Anodes	Lacquer	Machine Castings		
Nuts—Tray	Laundry	Machinery Repairs		
Paper Brass	Lead	Misc. Supplies		
Rivets	Leather Scrap	Pats.—Repairs	ADDITIONS TO PLANT	WAGES
Rings—Malleable	Lights	Patterns—Brass		
Revolts	Misc.	Piping & Fittings		
Scrap Steel	Nails	Screws, Bolts, etc	Fixtures—New	Pay Roll
Steel—Cast	Office Expenses	Sheet Metal	Machinery—New	
Steel—Spring	Oil and Grease	Sprinklers, Repairs	Real Estate—New	
Trapper's Guide	Paper and Twine	Steel—Machine		
Wire, Brass	Patt.	Steel—Tool		
Wire for Chains	Pencils	Tools		Discounts to P. R.
Wire for Dogs	Rebel Ass'n.			
Wire for Rivets	Salt			
Wood Cases	Sandpaper			
	Scrap—Misc.			
	Stencils			
	Teaming			
	Telegraph & Telephone			
	Trav. Exp. M'f'g.			
	Waste and Rags			

Fig. 4.—Summary of Expense, Measuring 15 x 14 Inches.

LALANCE & GROSJEAN MFG. COMPANY'S NEW CHICAGO WAREHOUSE.

THE LALANCE & GROSJEAN MFG. COMPANY of New York City, whose Chicago branch has been at 81 and 83 Michigan avenue for a number of years, have just completed a large and most substantial warehouse at Clark and Nineteenth streets in that city. This warehouse, as will be seen by the accompanying illustrations, is peculiarly fitted, both by location and design, for the proper storage and speedy handling of the lines of agate nickel-steel and other enameled wares, tinware, &c., for which the concern are so widely known. The building is 79 x 152 feet inside dimensions, and consists of six stories and a basement. It is what is known as slow burning semi-mill construction, and was erected in accordance with the specifications and requirements of the Factory Mutual Insurance Company. A feature of the construction is the way the posts and girders rest upon cast iron pintles, or shoes. The usual custom of using wood bolsters throughout a building puts the floors out of level with the shrinkage of the bolsters. This is entirely done away with by the use of cast iron pintles. The girders also rest on top of the posts and are not supported by brackets or projections at the sides. With the exception of the edges of these pintles, the whole of their surface is concealed by the girders, thereby protecting the iron in case of fire.

An electric Eaton & Prince 8 x 10 foot elevator in the center of the building serves the seven floors, and cases of goods on each floor are so arranged as to leave broad aisles at the sides and in the center, to facilitate the trucking of goods to and from the elevator.

A novel and noteworthy feature of the warehouse is the arrangement of a wing at the west side of the second floor to permit the switching of three freight cars, or two cars and a locomotive, directly into the warehouse from the adjoining tracks of the Lake Shore and Rock Island railroads. In order not to lose valuable space in the basement, the switch track is supported by 12-inch steel beams, placed 12 inches from centers, and supported on both sides by heavy brick walls. These beams are covered with a ¼-inch sheet steel floor, riveted to the flanges of the beams and built into the brick walls on both sides. The rails for the switch track are laid directly on the sheet steel, and are clamped to the beams with clamps especially designed by the engineers of the Lake Shore and Michigan Southern Railroad. This arrangement actually divides the west end of the building into two stories, occupying the same hight as three stories in the east part. The space under the steel floor is partly occupied by a boiler and coal room. A sliding steel door or curtain closes the track entrance. The track is sunk just low enough below the level of the floor to bring the floor of the cars level with the unloading platform. Outside of the sliding door this platform extends along the side of the building and 36 feet beyond it southward, in order to permit of loading or unloading

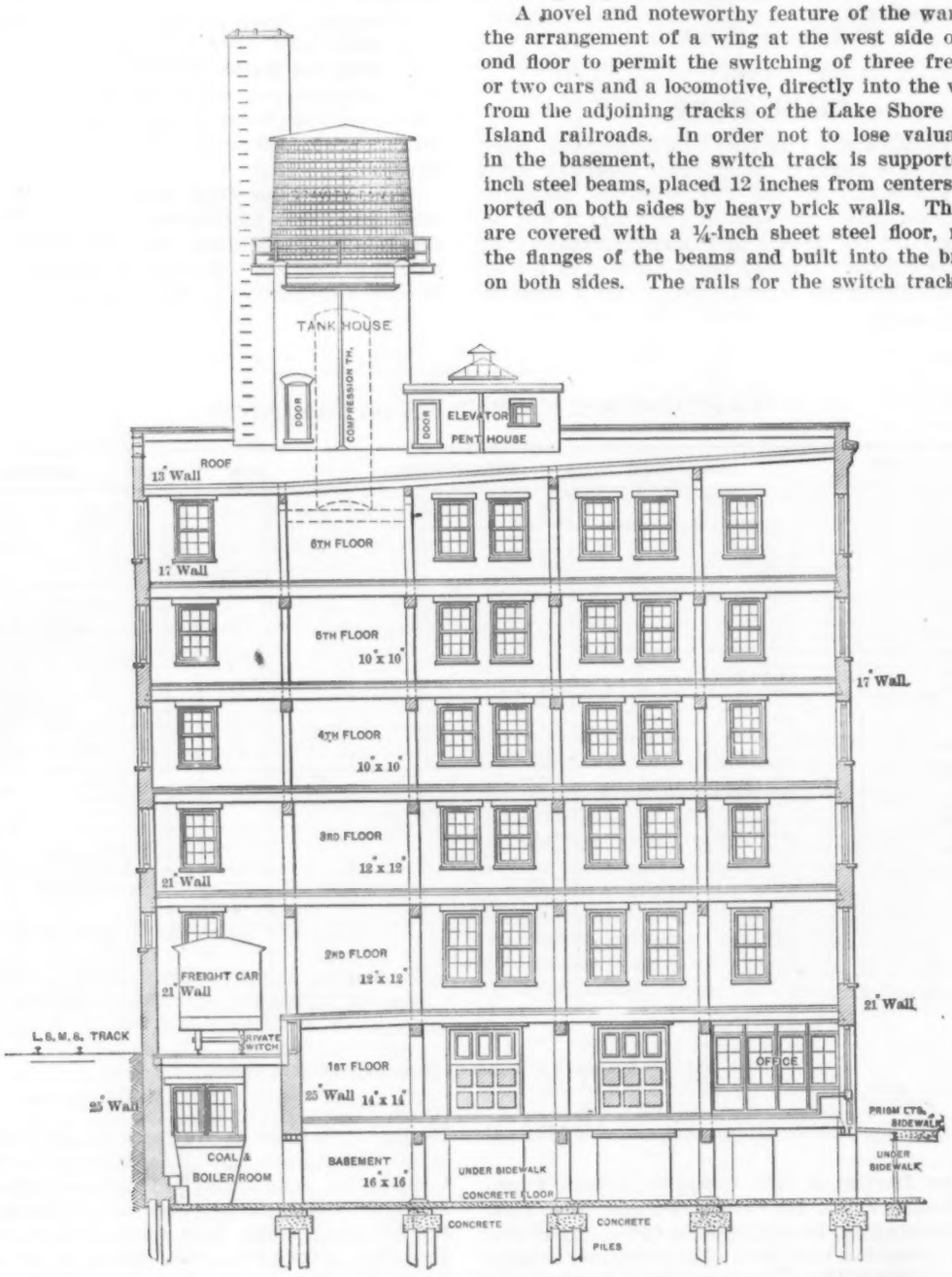


Fig. 1.—Vertical Cross Section.

LALANCE & GROSJEAN MFG. COMPANY'S NEW CHICAGO WAREHOUSE.

two additional cars. There is no grade from the adjoining railroad tracks into the building, owing to the fact that the railroad is elevated about 10 feet above the level of the adjacent ground. A cement loading and unloading platform for wagons extends the width of the building at its north end, the platform being level with the floor of an ordinary dray. As Nineteenth street is closed by the embankment of the railroad, the stub end of the street is at the disposal of the company for handling their wagon traffic without interference or interruption. Jackknife doors lead from the building to the shipping platforms.

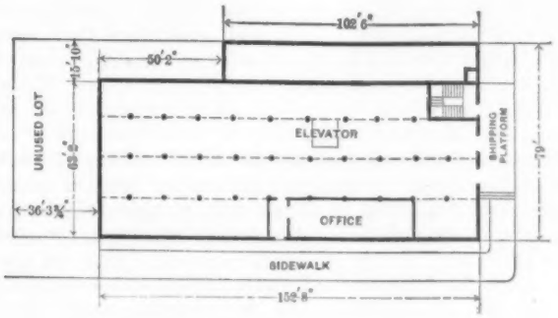


Fig. 2.—Plan of First Story, with Dimensions.

forms. By the arrangement just described it will be seen that boxes of goods may be unloaded from freight cars in the building, trucked to the elevator, lowered one floor and, without leaving the truck, be wheeled to waiting wagons for reshipment by local freight.

The third floor is filled with a series of shelving, divided into compartments, or bins, and in these bins, which are numbered serially, stock for broken package shipment is stored. The center of this floor, to one side of the elevator, is the packing and weighing floor. On each floor the aisles are numbered and sections lettered, and the stock book shows by letters and numbers the exact location of each case of goods, so that even the most unskilled freight handler can quickly get any case desired.

A broad daylight stairway connects the floors at the north end of the building, and entrance to the stairs is through steel fire doors, which automatically close, by the melting of a fusible retaining link, in case of fire. A fire escape is built at the opposite end of the building.

The whole seven floors are protected against disastrous fire by the Niagara Fire Extinguisher Company's wet type overhead sprinklers. This system is in two

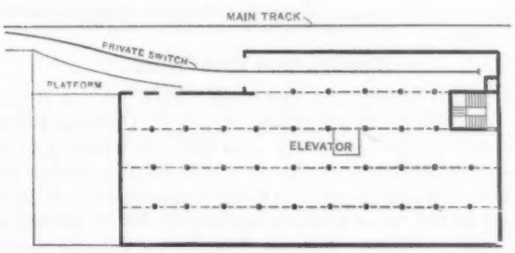


Fig. 3.—Plan of Second Story.

units, the northern and southern halves of the system being controlled separately, each having its own cutting-off device. This device, by the throw of levers, cuts off the admission of water to the pipes and permits water already stored in them to flow into the sewer. This arrangement prevents the damage of property by water after fire has been extinguished. The water for the sprinkler system is pumped from the city mains into two steel pressure tanks extending from the sixth floor to the top of a penthouse on the roof and to a 20,000-gallon wooden gravity tank, also on the roof. This latter tank is intended for reserve supply, and the water in it is prevented from freezing by the admission of steam from the boiler in the basement.

The building is lighted throughout by arc and incandescent lights and is heated by means of steam from a tubular boiler in the basement. Steam from the boiler is conducted to the fourth floor, from which it is carried upward to floors above and downward to the lower floors.

The east frontage of the northern half of the main floor is partitioned off for the office, and finished in Georgia pine. A telephone and tube system will furnish communication between the office and various parts of the warehouse. The whole structure is an excellent type of modern warehouse in its construction and arrangement.

The architect is Fritz Foltz, 69 Dearborn street, Chicago.

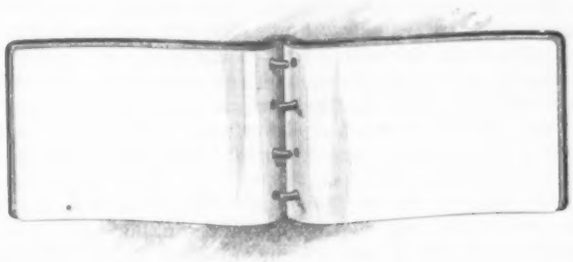
This establishment is but one of the departments of the Lalance & Grosjean Mfg. Company's immense business. Their factory at Woodhaven, L. I., N. Y., is one of the largest establishments of its kind in the world, and they own and operate large rolling mills, tin plate works and foundry at Harrisburg, Pa., where is manufactured the material used at the Woodhaven plant. The home office of the concern is located at 19 and 21 Cliff street, New York, and they also have a New England branch at 351 Congress street, Boston. The list of their products is a very extensive one, including several kinds of enameled ware, headed by the renowned agate nickel-

Fig. 4.—Cast Iron Pintle Used at Column and Girder Intersections.

steel ware, plain and retinned tinware, hotel ware, japanned ware, galvanized ware, milk cans, kitchen sinks, &c. The officers of the company are: President, Augustus J. Cordier; vice-president, James Cochran; secretary-treasurer, James D. Fleming. Their Chicago branch is in charge of Palmer W. Holmes as manager.

LOOSE LEAF MEMORANDUM BOOK.

TENGWALL FILE & LEDGER COMPANY, Ravenswood Station, Chicago, in connection with their other Tengwall loose leaf devices, are now offering the loose leaf memorandum book shown herewith. This little book is 2 inches wide by 4 inches in length, and nicely fits the vest pocket. It is neatly bound in black flexible leather covers, and contains 50 blank sheets, green edged and perforated. By pressing the covers back the prongs are separated as shown, and a single sheet, or any number of sheets, may be instantly removed without disturbing any of the other sheets. Extra leaves may be inserted to replace the sheets used or destroyed.



Loose Leaf Memorandum Book.

WILLIAM POWELL, formerly secretary and treasurer of the Columbian Hardware Company, Cleveland, Ohio, has retired from that company, and Ludlow Sherwood, who has had charge of their Chicago office, has been elected secretary and general manager.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., March 26, 1904.

The Week's Hardware Trade.

IT is pleasant to place on record any improvement in the general conditions of the Hardware trade, even if such improvement be but slight. There can be no doubt, I think, that on the whole trade at the present moment is slightly better than it was a month ago. There is something in the air that leads men to suppose that during the next quarter we shall do much better trade than for some time past. My own view is that if we take the trade generally of the three great manufacturing countries—America, Germany and Great Britain—it will be found that there is a general shrinkage in effective demand, and that, in consequence, trade will tend to decline for some time to come. But the difference between good trade and bad trade is not nearly so great as is sometimes assumed. I question if it means more than a decrease of 5 per cent. in the general turnover. Assuming this to be the case, the movement downward from normal, or 100 per cent., to bad, or 95 per cent., is necessarily slow, probably extending over a period of two or three years. Inside these limits there are temporary movements either up or down, and in making one's arrangements for the future it is well to bear in mind the general tendency of trade, as well as to watch the more immediate and temporary ups and downs which are created by local conditions. Thus, even if in general trade tends to fall and is contemporaneous in all countries, it is none the less a fact that at any given moment local affairs may involve a smart rise in prices or a sudden demand in various localities. This is what is happening at the present moment, I think, in Great Britain. The growing depression, caused partly by the war expenditure, partly by general shrinkage in the crops over the face of the earth, has led to traders letting their stocks run as low as possible. Suddenly it is discovered that these stocks have fallen below the point of efficiency, and in consequence there is a gradual buying movement to bring up stocks to their average quantity.

The improved weather, combined with the approaching Easter vacation, has stimulated the home demand for Garden Tools and Appliances, trunks, portmanteaus and other traveling requisites. Brass founders also have experienced an improved demand for Blind and Window Furniture, Curtain and Stair Rods and Fern and Flower Vases. This is, of course, owing to the advent of spring cleaning. Spring and Axle makers are busy on orders for London and the North of England, but the principal demand in this department has been for railway and tramway Wheels and Axles, on which Midland manufacturers are busy. Spades, Forks, Shovels and Farm Cultivating Tools are selling well in the North of England, and good orders for Hoes, Axes, &c., have been received from several of the South American republics.

On overseas account good business is being done just now with Australia, New Zealand, India, South America and the West Indies. A fortnight or three weeks ago there seemed to be some improvement in the South African trade, but matters have again lapsed. Complaint is made in some quarters that South African bankers are to blame to some extent for the present unsatisfactory situation. Thus a large exporting firm, having received a banker's reference in regard to a South African customer, send out stock in heavy quantities, and the next thing we hear is that the banks are suddenly calling in their overdrafts. This has happened in more than one case to my own personal knowledge, and I hear similar complaints in various quarters.

In Sheffield extreme dullness is still the characteristic of the electro plate trade, and also Cutlery is very quiet. The state of employment in these trades is very unsatisfactory to those who were hoping that as the year advanced we should hear less of the cry of distress. As a matter of fact, the distress is probably more acute among silversmiths, cutlers and white metal workers than among any other section of the industrial population of the city at present. The Edge Tool trades, being less dependent on seasonal and general commercial fluctuations, continue fairly busy. Among comparatively recent novelties of the Cutlery trade the Safety Razor seems to be making headway in Sheffield. Originally a German and American article, several Sheffield firms, as well as other British manufacturing houses, have taken up this useful contrivance, and it is undoubtedly making headway with the public.

A Strike in the British Bedstead Trade.

It will be within the recollection of *The Iron Age* readers that a few years ago the Bedstead trade was in a prosperous condition, this happy state of affairs being largely ascribed to the maintenance of the trade alliance. This alliance suddenly collapsed, and since then reckless competition has been the order of the day, followed, as is usually the case, with reductions in wages. Under the alliance wages were advanced to a bonus of 30 per cent., this 30 per cent. representing the men's share of the increased profit obtained as the result of the alliance. After its collapse wages were reduced by gradual stages, until finally a bonus of 15 per cent. represented all that the men were able to retain of their previously prosperous condition. But even this 15 per cent. bonus has been too much for some of the manufacturers, and accordingly a number of manufacturers, representing about three-quarters of the whole, gave notice a week ago of their intention to discontinue the bonus altogether. The workmen engaged in the Bedstead trade were prompt to take action, and the following questions were submitted: 1, Are you willing to work without the bonus? 2, Are you willing to strike for the retention of the bonus? The answer to the first question is practically a unanimous No, and to the second question a unanimous affirmative. On Thursday the masters offered to refer the matter to arbitration, the notices of reduction to be withdrawn on the men's acceptance of arbitration. Yesterday the men met, and unanimously passed a resolution reaffirming the previous decision to resist the reduction. The resolution also refused to submit the question of the bonus to arbitration, "seeing that one-third of the manufacturers consider the bonus only just and fair." The motion proceeds: "When the Workmen's Association, at the break-up of the Manufacturers' Association, asked that association to submit the final reduction to arbitration they refused to do so. We see no course but to follow the same action. We thank those manufacturers who have decided to continue the bonus of 15 per cent. to their men, and in return we will do our utmost to further their interests." The men are well organized, and are quite confident that they will retain their 15 per cent. bonus. Inasmuch as the manufacturers themselves are divided upon the point, it would seem as if the men have good reasons in their expectation of victory.

Birmingham Gun Trade.

A report which has just been issued by the Birmingham Gun Barrel Proof House shows that during the year the total number of proofs was 427,474, which yielded a revenue of £4953, as compared with 376,788 proofs and a revenue of £4292 in 1902. Of the total number of Barrels proved 96,674 were provisional proofs, while by the definite proofs 133,270 were in respect of Muzzle Loading Arms, 107,627 Breech Loading Arms, 65,104 Pistols, 412 sundries, and 24,387 supplementary proofs relative to Breech Loading Arms, the corresponding figures for 1902 being: Provisional proofs, 94,039; definite proofs in respect of Muzzle Loading Arms, 99,439; Breech Loading Arms, 94,228; Pistols, 69,597; sundries, 588; supplementary proofs, 18,897. The total revenue of the year amounted to £5809 16s. 6d., which yielded a surplus balance of £831 19s. 4d.

Russian Import Regulations.

The Russian Council of Ministers has reached a decision approved by the Czar extending for a year the common tariff on European imports into Russia established on February 26, 1903, which expired on December 31 last, and also the temporary regulations with regard to imports. A similar extension of time is made in the case of the following regulations: 1. The regulations for the admission duty free of Tin Plate for the manufacture of barrels to be used in the kerosene export trade. 2.

The regulations published on February 28, 1902, regarding the readmission free of duty of packing cases, &c., used in the export of certain products on which duty was paid on the occasion of their first introduction into Russia. 3. The regulations with regard to the granting of favorable treatment in cases where foreign sacks are used in the transport of corn and flour dispatched to places abroad and destined for Russian ports in the Pacific Ocean and in Finland.

South African Steam Freights.

The agitation against the South African shipping rings still continues unabated. E. J. Cattell, the Cape Town correspondent of the Board of Trade, writes that up to the present the American has had a great advantage over his English competitor, by the assistance afforded him in the matter of low rates of freight, this being very frequently as much as 50 per cent.

Motor Cars and Agricultural Implements in Australia.

It has been my pleasure once or twice recently to meet Australian buyers. One Australian came in here this week, asking for introductions to suitable American houses whom he might represent in Australia upon his return. He crosses the Atlantic within the next few days, and will do his best to open up business connections with American exporters who are prepared to cultivate the Australian trade. In this connection I would draw attention to the rapid growth of the motor car and light agricultural implement trade in Australia in general, and in New South Wales in particular. The motor car is rapidly rising in favor throughout the commonwealth, and there is every prospect of the demand assuming considerable proportions during the next few years.

American agents, finding the ground for the heavy kinds of agricultural machinery fully occupied, are directing their attention more closely to the trade in farming implements. The specimens of Plows, Forks, Rakes, Hoes and other tools shown are of excellent make; not better, perhaps, than those of English origin, but admirably adapted for the use of Australian agriculturists. It would not be a bad thing if a display of British and American farm tools could be organized in London. It would be an eye opener for the trade, especially if each kind of tool from the two countries were placed in juxtaposition. More than half the Saws and two-thirds of the Axes used in the commonwealth are imported from America, but there is no reason why British manufacturers should not produce equally serviceable goods.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers issuing new catalogues or price-lists are requested to send to THE IRON AGE *two copies—one for the Catalogue Department in the New York office and one for the Iron Age Library of Trade Literature in London.*

AMERICAN STEEL & WIRE COMPANY, Chicago, Ill.: Illustrated folder devoted to Wire Tacks, including Carpet, Upholsterers' and Bill Posters' or Railroad Tacks. These are shown in connection with the company's tricolored package and display cases of Tacks.

THE HURWOOD MFG. COMPANY, Plantsville, Conn.: Illustrated catalogue devoted to varied lines of Screw Drivers and Awls, Meat Hooks, Ball Bearing Side Cutting Pliers, Screw Driver Bits, Nail Sets, Punches, Box and Hay Hooks, Self Adjusting Wagon Wrenches, Ice Picks, Tack Pullers, &c.

THE ENTERPRISE MFG. COMPANY, Akron, Ohio: Catalogue No. F23, devoted to artificial Fish Baits and Anglers' Specialties. These include Pflueger's Fishing Tackle, Trolling Spoons, American Spinners, Hard and Soft Rubber and Phantom Minnows, Frogs, Crawfish, Grasshoppers, Dodsons, Insects, Bass, Salmon and Trout Flies, Ringed Hooks, Reels, Hooks to Gut and Gimp, Line Spreaders, Minnow Gangs, Furnished Lines, Floats, Sinkers, &c.

THE G. DROUVE COMPANY, Bridgeport, Conn.: Illustrated pamphlet of the Lovell Window and Shutter Operating Device for use in factories, foundries, mills, &c. With this device a line of sash 500 feet long can be operated from one station, if desired.

LAMSON & GOODNOW MFG. COMPANY, Shelburne Falls, Mass.: Illustrated catalogue devoted to Table Knives and Forks, Molets, Carvers, Carving Forks, Steels, Slicing Knives and Forks, Cheese Knives, Pot Forks, Fruit, Orange, Lemon, Pie and Butter Knives, Nut Picks, Cheese Scoops, Bread, Kitchen, Butcher, Sticking, Skinning, Boning, Hunting, Banana, Fish Cleaning and Scaling, Paper Hangers', One-Arm, Printers' Ink and Cigar Knives, Spatulas, Pallette, Putty and Scraping Knives, &c.

WM. PORTER'S SONS COMPANY, 67 Fulton street, New York: A large paged, well printed catalogue representing their manufactures, including Oil and Electric Marine Light Fixtures, Lamps, Lanterns, &c.

L. L. HULL COMPANY, Clinton, Conn.: Catalogue No. 11, illustrating and describing their line of Tea and Counter Scales.

UNION FIRE ARMS COMPANY, Station B, Toledo, Ohio: Catalogue and price-list showing Single and Double Barreled Shotguns, Double Barreled Automatic Ejector Shotguns and Six-Shot Magazine Shotguns. Every Gun sold by them is covered by their "binding guarantee," which means that if any piece or part gives out by reason of defective material or workmanship within one year they will replace it free of charge.

THE FORQUIGNON MFG. COMPANY, 13 East Sixteenth street, New York: Catalogue of their long line of Manicure and Pedicure Supplies, which is profusely illustrated, showing all kinds of Nail Files, Cuticle and Corn Knives, Chiropody Instruments, Hair, Sliver and Surgical Tweezers, Cuticle and Nail Scissors and Nippers, Buffers and many kindred articles. They are prepared also to get up special goods with private brands when ordered in sufficient quantities. A 20-page booklet on "How to Manicure" is also gratuitously distributed.

HOLMES & BLANCHARD COMPANY, 36 Washington street (North), Boston, Mass.: Catalogue B, relating to their various Mills for grinding white lead, paints, litharge, ink, colors, minerals, &c., in oil, japan, water or other mediums; also Putty Mills, Chasers, Mixers, Sifters, Agitators and the various accessories pertaining to complete paint and lead plants.

MT. PLEASANT TOOL COMPANY, Mt. Pleasant, Pa.: Illustrated price-list of Shovels, Spades, Coal and Grain Scoops, and Draining and Ditching Tools.

BRYAN MFG. COMPANY, Bryan, Ohio: Catalogue of Champion Wheelbarrows, including Railroad, Mortar, Garden, Stone and Brick Barrows and Tubular Steel Barrows of all kinds. Among the features possessed by their Barrows the company refer to the patented staple axle bolt for attaching wheel to handles, malleable shoe for combining legs and braces, and their new three-ply wood tray, for which special claims are made.

R. S. BATTLES, Girard, Pa., one of the most prominent business men in Northwestern Pennsylvania, died very suddenly of heart failure at his late home in that place on Sunday evening, March 27, in the seventy-first year of his age. He was owner of the R. S. Battles Bank, which he with his brother-in-law, the late H. M. Webster, founded in 1859. He was one of the promoters of the Girard Wrench Mfg. Company, and their efficient treasurer and a director from their formation in 1875. He was proprietor of the Climax Mfg. Company, at Corry, Pa., one of the largest manufacturing establishments in that city, employing 150 men, and the eminent success to which all these enterprises have attained was largely due to his untiring zeal, mature judgment, together with his rare executive and mechanical abilities. He was also a successful farmer, owning and managing a fine farm of over 300 acres, upon which he was born and always lived. His life had been an active force in this community, and he will be greatly missed. He is survived by his widow and one daughter.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS *for catalogues, price-lists, quotations, &c., have been received from the following houses:*

FROM THE KRAUS & GRAW HARDWARE COMPANY, Port Washington, Wis., who have been incorporated with a capital stock of $25,000, and succeed Kraus & Graw in the Hardware, Stove, Agricultural Implement, Paint and Sporting Goods business.

FROM THE JONES HARDWARE COMPANY, Milford, Texas, who have been incorporated with a capital stock of $7500 to conduct the Hardware, Stove, Implement and Sporting Goods business.

FROM THE FISK, KELLY COMPANY, LIMITED, Central Lake, Mich., who have succeeded U. J. Ackley in the Hardware business and will add plumbing, &c.

FROM AMBROSE BROS., who are successors to Winton & Hornby, at Delta, Col., dealers in Hardware, Stoves, Paints, Furniture, &c.

FROM PITTMAN-COATES HARDWARE COMPANY, Battle Creek, Mich., who have succeeded F. L. Pittman, in Shelf and Heavy Hardware, Stoves, Tinware, Furnaces, House Furnishing Goods, &c. The store has been remodeled and a Mantel and Grate room added.

FROM E. M. SMITH, Waterloo, Iowa, who has bought the Hardware and Implement business formerly conducted by F. D. Popp.

FROM WILLIS & MOWRY, Manchester, Tenn., who have succeeded Dickens & Rogers in Shelf and Heavy Hardware, Stoves, Farming Implements, Mill Supplies, Furniture, &c.

FROM THE CROOKSVILLE HARDWARE COMPANY, Crooksville, Ohio, who have lately entered business as dealers in Shelf and Heavy Hardware, Stoves, Agricultural Implements, Paints and Oils, Sporting Goods, &c.

FROM SMITH-DAVIES HARDWARE COMPANY, Bessemer, Ala., who have just incorporated with a capital of $3000 to carry on the wholesale and retail business in general Hardware and Builders' Supplies.

FROM J. F. DIXON, Lookebar, O. T., who has recently commenced the retail business in Hardware, Stoves, Harness, &c.

FROM RICHMOND & BEARDSHEAR, Amelia, Neb., who have purchased the Hardware and Implement business formerly conducted by A. E. Sammons.

FROM C. S. SPURR, Filley, Neb., who has succeeded J. W. Wright in Hardware, Farm Implements, Stoves, Paints, Sporting Goods, Groceries, &c.

FROM G. W. WOOD, Hobart, N. Y., who has succeeded Frank G. Silliman in the Shelf Hardware, Stove, Farming Tool and Crockery business.

FROM J. J. REED & Co., Kennewick, Wash., who have bought the stock of Hardware, Stoves, Farming Implements, Paints and Sporting Goods formerly owned by Rudow & Schweikert.

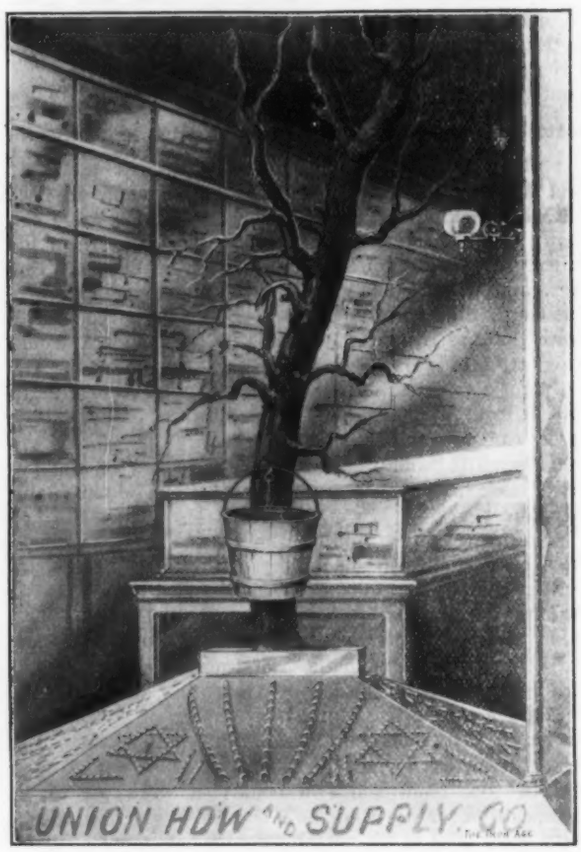
FROM THE GEO. H. FERNALD HARDWARE COMPANY, Sanford, Fla., who are desirous of receiving especially catalogues covering Pulleys, Shafting and all Machine Shop Supplies.

TROW & HOLDEN, Barre, Vt.; Illustrated price-list of Granite Tools, including Hand and Drilling Hammers, Bush Hammers, Bush Chisels, Wedges and Shims, Points and Chisels, Plug Drills, Striking Hammers, &c.

THE MT. PLEASANT TOOL COMPANY, Mt. Pleasant, Pa., manufacturers of Shovels, Spades and Scoops, now have their new plant in full operation, and are prepared to fill orders for these goods. Three styles of each will be made—plain, open and riveted back, each style being made in four different grades. The Eastern sales office, 511 Commerce street, Philadelphia, J. M. Rowland, president of the company, in charge, will have general supervision of the sales.

MAPLE SUGAR CAMP WINDOW DISPLAY.

THE UNION HARDWARE & SUPPLY COMPANY, Ashland, Ohio, recently arranged a store window display that attracted considerable notice, a reproduction of which here appears. A small maple tree was obtained and a ⅜-inch hole bored through it, into which was driven a spile as would be done in a sugar camp, it being fed with liquid "sap" from a small tank in the rear out of the public's vision, a ⅜-inch hose connecting the can with tree. The drip was regulated by means of a brass faucet. The remaining portion of the display



Maple Sugar Camp Window Display.

was confined entirely to an exhibition of maple sugar making supplies. The idea was conceived and skillfully executed by Ray Heichel, one of the clerks of the store.

HARDWARE FOR THE SCHWAB RESIDENCE

W. H. GOODFELLOW & SON, Hardware merchants, Altoona, Pa., closed a contract March 30 for the Hardware for the handsome new residence of Charles M. Schwab at Seventy-third street and Riverside Drive, New York City. This house make a specialty of going after large jobs of this character, and find it a most profitable part of their business. The Hardware for five or six rooms of the residence is to be imported from France, the remainder of the big structure being trimmed with Hardware made by the Reading Hardware Company. They also secured the contract for Plate and Mirror Glass for the house. Last year the Messrs. Goodfellow supplied the Hardware for several large buildings in Pittsburgh, Braddock, Homestead and McKeesport, Pa.

Koehler and Hanson are successors to Koehler & Huesman in the Hardware and Farm Implement business at Odebolt, Iowa, Mr. Hanson buying Mr. Huesman's interest.

The Flanegin Hardware Company, Logansport, Ind., incorporated with a capital of $10,000, have succeeded J. T. Flanegin, Mr. Flanegin being president of the company.

AMONG THE HARDWARE TRADE.

Frederic C. Ruby, who has been associated with his father in the Hardware, Paint, Implement and Supply business at Oneida, N. Y., for a number of years, has bought an interest, and the style has become George H. Ruby & Son.

Cooper & Middleton have bought the Hardware and Agricultural Implement business of B. Vandeveide, Clarksville, Mo.

A new Hardware firm is that of Force & Booth, Danville, Ill. Both partners in this concern have been until recently traveling salesmen for the Norvell-Shapleigh Hardware Company of St. Louis.

The Emmert-Conrad Company, Marysville, Ohio, have been incorporated with a capital stock of $20,000, succeeding Emmert & Conrad in the Hardware, Stove, Paint, Implement, Sporting Goods and Furniture business. The sale of Furniture has lately been taken up, and a Plumbing and Tin shop will soon be added.

Brown & Schler Company, Grand Rapids, Mich., have incorporated with a capital stock of $300,000, and will succeed Brown & Schler in the wholesale Carriage, Wagon, Implement and Saddlery Hardware business and the manufacture of Harness.

The Carlisle & Grimes Company, Cambridge, Ohio, have purchased Nicholson & Secrest's store, at Byesville, and will continue the latter business under their own name. The company are wholesale and retail dealers in Shelf and Heavy Hardware, Stoves, Farm Implements, Paints and Oils, Sporting Goods, &c.

Salle & Wonsetter have succeeded Bathgate Bros. in the general Hardware business at Polo, Mo.

Eureka Hardware Company, Bluefield, W. Va., have recently embarked in business.

Steele & Torrance are successors to the Hardware, Stove and Paint business of R. B. Pease, Batavia, N. Y.

Rupp & Dietz have succeeded John Zimmerer & Co. in the Hardware, Stove and Plumbing and Heating business in Seward, Neb.

Bond Hardware Company, Muscatine, Iowa, have dissolved, M. N. Bond disposing of his interest to H. Huchendorf.

W. F. Dodds has succeeded Ashford & Dodds in the Hardware and Implement business at Bolckow, Mo.

G. E. Bishop, who has conducted a Hardware store at Dowagiac, Mich., has taken into partnership Isaac T. Armstrong, who, after serving in the capacity of a clerk for Mr. Bishop for 18 years, has bought an interest in the business. The name of the firm has been changed to the G. E. Bishop Hardware Company.

T. L. Hopkins, a traveling salesman for the Norvell-Shapleigh Hardware Company, St. Louis, has opened a store for the sale of Hardware, Sporting Goods and Cutlery at La Crosse, Wis.

The Jaynes Hardware Company, Greenwich, Conn., have been incorporated under Connecticut laws with an authorized capital stock of $10,000. The incorporators are F. W. Jaynes, Annie L. Jaynes, M. V. Jaynes and W. F. Boercum.

H. F. Carter has purchased Thompson Bros.' Hardware stock at Hubbard, Iowa.

Gibson & Miller are successors to Gibson & Son in the Hardware and Implement business at Americus, Kan.

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HARTFORD HARDWARE ASSOCIATION.

THE HARTFORD HARDWARE ASSOCIATION affords an instance of the good results of frequent meetings of a social nature in bringing the trade into a complete and friendly understanding as to the various factors which enter into competition based on business principles. Every retail Hardware dealer in Hartford and New Britain is a member of the Hartford Association, which is confined to the retailers; and every month on the first Tuesday they get together for a meeting, which is generally accompanied by a dinner. The association was organized in July, 1889. The officers are: President, A. H. Abbe, A. H. & E. W. Abbe, New Britain; secretary, C. L. Way, Way Hardware Company, Hartford.

The Press Committee consists of J. F. Tracey, Tracey, Robinson & Williams Company; W. E. Cone, J. H. & W. E. Cone; Isaac Bragaw, Way Hardware Company; H. H. Ensworth, L. L. Ensworth & Son, and J. C. Woolley, Woolley Hardware Company, all of Hartford. The Entertainment Committee consists of E. M. Francis, Francis & Co., Hartford; I. C. Treat, Clapp & Treat, Hartford, and H. L. Mills, New Britain.

The other members of the association are Cadwell & Jones, Blodgett & Clapp Company, R. C. Witte, J. C. Bidwell Company, Ralph E. Page, all of Hartford, and the Barnes Hardware Company, New Britain.

MISCELLANEOUS NOTES

The Bigelow Wire Fly Killer.

J. F. Bigelow, Worcester, Mass., manufactures the Bigelow fly killer, which is made of fine spring steel plated wire. Attention is directed to the fact that it kills, but does not crush the fly, and that the insect may be dispatched without soiling the most delicately tinted wall or paper. The length of the device is 16 inches. The killers are packed in boxes of one dozen each and shipped in one, two and three gross boxes. The manufacturer furnishes neat display stands free of charge.

Pattern Letters and Figures.

The Metal Goods Company, Belmont, N. Y., have recently been organized for the production of white metal and brass pattern letters and figures. The members of the concern have had several years' experience in this line, and advise us that they have utilized several new ideas that facilitate the manufacture and materially improve the quality of their product. The company have issued a price-list, in which full size illustrations are given of the leading sizes and styles.

Western Wire Goods Company.

Western Wire Goods Company, Buffalo, N. Y., are manufacturing a general line of wire products, including bright wire goods, brass cup hooks, coat and hat hooks, kitchen wire goods, &c., as well as specialties to order. They call special attention to their garment hanger, which has an offset to protect the coat collar; Buffalo special broiler, which has braced handles and is of cheap design, yet very strong; Dean sink strainer, with hook at corner to hang up, if desired, in corner of sink; Perfection dust beater, which is of coiled wire and possesses great elasticity while being very durable. The company have recently issued a catalogue in which their manufactures are attractively shown.

G. W. Powers of Streator, Ill., has retired from active business and has disposed of his interest in the corporation of Powers & Williams, Hardware merchants, of that city, to Chas. H. Williams, who will continue under the corporate name as heretofore. Mr. Williams is well known to the Hardwaremen of the State as the efficient president of the Illinois Retail Hardware Dealers' Association. The store was damaged by fire some weeks since, and we have been favored with a fine snapshot picture taken during the fire, and also one showing the buildings after the fire with salvage sale in progress.

Home Companion Tool Sets.

The Goodell-Pratt Company, Greenfield, Mass., have recently put on the market Home Companion tool sets, as shown herewith. These sets comprise assortments of useful tools, put up in polished hard wood cases, conveniently arranged and particularly adapted for home, office or workshop use, or, in fact, in any place where odd jobs have to be done. The No. 700 set, illustrated in Fig. 1, contains two ratchet screw drives, one with 6-inch blade, and the other with 1½-inch blade; one automatic drill, with cocobolo handle; one set of eight drills for same, ranging in size from 1-16 to 11-64 inch; one Universal tool handle; one set of tools for same, comprising two gouges, two chisels, one reamer, one saw, one gimlet, one screw driver; one nail set, one prick punch, one drive punch. The size of the box is 13 x 5 x 3 inches, and the weight is 3½ pounds. The No. 710 set, shown in Fig. 2, is somewhat larger, and has a more extended assortment of tools. It contains one ratchet screw driver, 6 inches; one ratchet screw driver, 1½ inches; one hand shave, one hack saw frame, full polished and nickel plated; six coarse teeth blades for same, three fine teeth blades for same, two extra fine teeth blades for same; one polished bone saw, one glass cutter, one cocobolo handle automatic drill, equipped with eight drill points from 1-16 to 11-64 inch; one Universal tool handle for holding one gouge, two chisels, one screw driver, two brad awls, one gimlet, one reamer, one saw; one nail set, one prick punch, one drive punch, one solid punch, one oil stone. The size of box is 16 x 8 x 3 inches, and the weight is 6 pounds. Both of these sets are exceptionally well made, furnished in conveniently arranged, nicely finished cases, the tools being held in place by nickel plated clips.

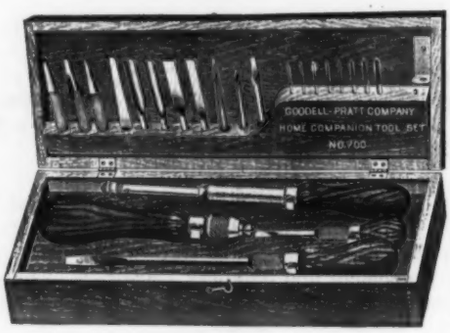
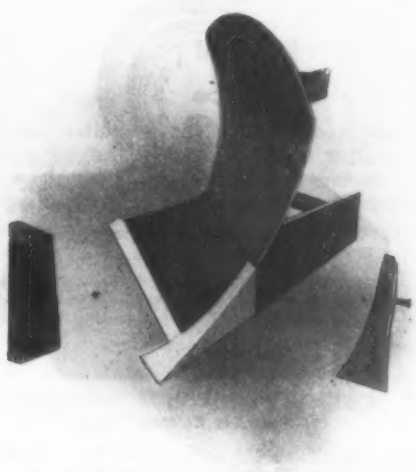


Fig. 1.—No. 700 Home Companion Tool Set.

Fig. 2.—No. 710 Home Companion Tool Set.

Currey Plow Point and Cutting Blade.

Two Western manufacturers of plows are placing on the market a new form of plow based on the Currey patents. As will be seen by the illustration, the vital departure in this construction is the use of the self sharpening detachable cast steel point and crucible steel cutting blade. The cutting blade is inserted between a lower share or frog and an upper wear plate, and held firmly in position by clamping the two together. The inner end of this blade is hidden beneath the point. The outer end projects a little beyond the lay or wear plate, thus protecting it from wear and insuring a full cut at all times. It is claimed by the manufacturers that 50 to 100 acres of hard, dry land may be plowed with this implement without removing the cutting blade, and that it is never necessary to put the hardened cast steel share or wearing



Currey Plow Point and Cutting Blade.

plate in the blacksmith's fire; as a consequence, it is said, it will last as long as the mold board, while with the ordinary plow three to ten shares are worn out with one mold board. The Currey attachments can also be fitted to other walking, sulky or gang plows. The point can be detached and replaced by removing one bolt. The blade is detached by loosening the nut on the tension bolts, and the bottom or frog by removing two additional bolts. The share or wearing plate is very thin on the edge, necessary strength being obtained by gradually increasing its thickness further back. It is claimed that the character and position of this cutting edge make it self sharpening. The saving in draft effected by the Currey point is due to this self sharpening feature, as it is claimed that the Currey plow is at all times as light in draft as any of the old steel plows when newly sharpened, and that it avoids the increase in draft due to the blunting of the old plow share. The leading makers of the new plow are the Morrison Mfg. Company, Fort Madison, Iowa, and the Peru Plow & Wheel Company, Peru, Ill.

Cronk's Adjustable Alligator Wrench.

The Cronk & Carrier Mfg. Company, Elmira, N. Y., are manufacturing the Cronk patented adjustable alligator wrench, here illustrated. The distinguishing feature of this wrench is the device by which an instantaneous adjustment is effected, which is accomplished by

Cronk's Adjustable Alligator Wrench.

merely moving the mechanism with thumb or finger. The sizes are 6, 8 and 10 inch, opening, respectively, ¼ to 1 inch, ¼ to 1¼ and ¼ to 1½ inches. The surfaces are polished and nickeled.

Success Cream Separator.

We illustrate herewith the improved Success cream separator, a product of the Seither-Cherry Company, Keokuk, Iowa. Fig. 1 shows the separator complete, while Fig. 2 permits a glance at its inner mechanism. As will be seen, the construction of the separator does not involve the mixing of water and milk, an outside can being provided for water, or ice if desired, this can surrounding the inner compartment containing the milk. A tube passing through the center of the milk can, spreading out funnel like at the bottom, also assists the cooling process, the sloping bottom causing both milk and cream to flow

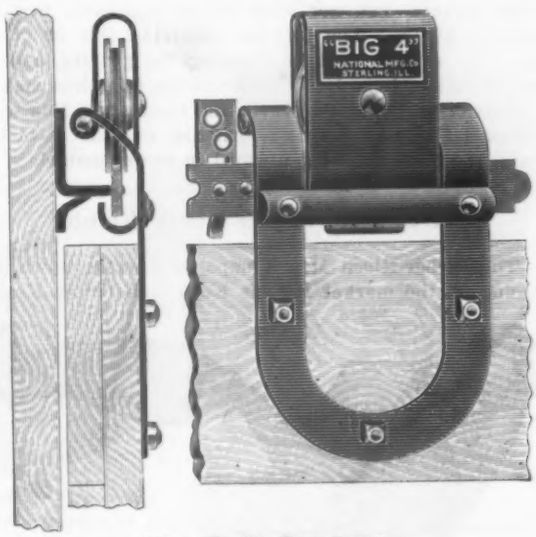
Fig. 1.—Success Cream Separator.

Fig. 2.—Sectional View of Separator.

readily toward the faucet. The manufacturers lay stress upon the fact that the inner can is detachable, can be removed instantly and quickly and easily cleaned. The cover has a removable brass and cloth strainer and the faucet is so attached that it can be taken off and cleaned. The water tank is said to be made of the best galvanized iron, and the inside can of the best IXXX bright tin, with a coat of odorless paint on the outside to prevent rusting. The faucets are of brass. The separators are made in four sizes, with milk cans of 4, 6, 8 and 10 gallon capacities, the proportions of the water can in each case being double that of the milk can.

Big 4 Flexible Door Hanger

The National Mfg. Company, Sterling Ill., are offering the trade the Big 4 Flexible door hanger and rail, here illustrated. The wheel has steel roller bearings, and an ear of the wheel below the track prevents the wheel from jumping the track. The hinge joint allows the door to swing out at any angle desired. The novel feature of this hanger is the cross bar, which is referred to as keeping



Big 4 Flexible Door Hanger.

the door from vibrating and wearing out the hinge pin. The hinge joint being above instead of below, allows the top of the door to come up close to the bottom of the

track. The braced rail has a section of 1¼ x 3-16 inches. The company also manufacture door pulls, door holders, hasp and staple, strap and T hinges, wrought corner irons, wrought steel sash lifts, drawer pulls, screen and storm door sets, &c.

Banner Rotary Washing Machine.

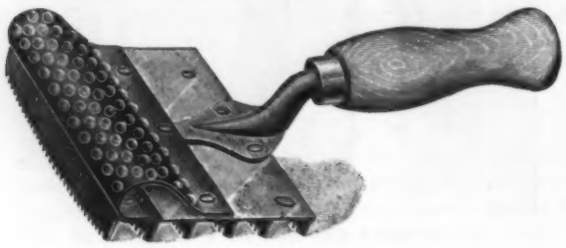
The Boss Washing Machine Company, Cincinnati, Ohio, are manufacturing the Banner rotary washing machine, here illustrated, which makes five different rotary washers, together with ten other styles of washing machines, which they produce. The Banner model has a capacity of eight shirts or an equivalent volume of other garments that can be washed in ten minutes. The dimensions of the tub are, outside, 23 inches at top, 25¼ inches at bottom and 11 inches inside. The gearing has roller bearings, which greatly reduces the friction and makes it possible to operate the machine with ease. It is stated that high speed is obtained without lost motion, a smooth operation being assured without any jerking or tearing of clothes, there being 19 three-quarter reversals of dasher to only 25 turns of fly wheel. The wheel can be turned to either right or left. The dasher or rub block is 10 inches in diameter and 1½ inches thick, corrugated on under side, the same as the inner side of the

Banner Rotary Washing Machine.

tub, and in addition to these corrugations there are four hard wood pins securely fastened to it. The entire tub, dasher included, is made of Louisiana red cypress, which the company allude to as indestructible lumber for washing machine purposes. The lid covers an opening 16½ inches square, fastened with patent malleable iron detachable hinges. The legs are nondetachable or of the stave leg variety, and in shipping the gearing and lid are left intact but placed inside of the tub, thus making a compact package and preventing breakage. The wood is finished in natural color, bringing out the attractive grain, the castings being finished in green enamel.

Kirch's Korn Kob Kurry Komb.

The Weber-Kirch Mfg. Company, Keokuk, Iowa, are placing on the market Kirch's Korn Kob Kurry Kombs,



Korn Kob Kurry Komb.

a combination of curry comb and rubber. Attention is particularly called, in the matter of construction, to the rough back of the comb. This serves the purpose of cleaning dry mud from an animal's legs, which, it is remarked, is usually done with a bunch of hay, corn cob, &c., as horses will not tolerate the sharp teeth of the curry comb commonly used. The curry comb illustrated is numbered 50 and has six bars, another size, No. 60, having eight bars and flexible back.

Fleur de Lis Electric Clock.

The American Electrical Novelty & Mfg. Company, 310 Hudson street, New York, have just put on the market the Fleur de Lis ever ready electric clock or night lamp, here illustrated. The base, of wood black enam-

Fleur de Lis Electric Clock.

eled, is 4¾ x 3¾ x 2¼ inches, the dry batteries supplying electricity to the lamp bulb being inserted at the bottom by removing a slide cover. The clock is nickeled, and 12 feet of insulated cord for each of the two connections, together with a bell shaped push button, are furnished to connect the head of bedstead with the time piece as it stands on mantel or dressing case, so that an individual in bed, by a pressure of the button, can see the time at any period of the night without getting up. It is especially well adapted for nursery, sick room or bedroom.

Towel Rollers.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., John H. Graham & Co., 113 Chambers street, New York, selling agents, have recently put on the market a group

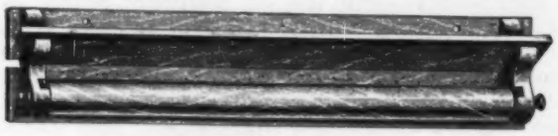


Fig. 1.—Towel Roller with Rack.

of towel rollers, two of which are here illustrated. Fig. 1 illustrates the No. 7 pattern in varnished oak, with slanting rack to hold comb and brush, and roller 1⅝ x 18

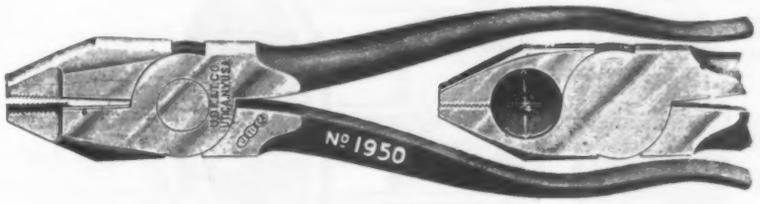
Fig. 2.—Towel Roller with Mirror and Rack.

inches. Fig. 2 shows the No. 6 in varnished oak, having 3 x 6 inch plate mirror with slanting rack and roller 1⅝ x 19 inches. The No. 7 rollers are packed in crates of 12 and the No. 6 a half dozen in a crate. A No. 8 is made of white maple, varnished, with simply a roller, 1⅝ x 18 inches, and a solid back, packed 12 in a crate.

L. of C.

Samson Side Cutting Plier.

The Utica Drop Forge & Tool Company, Utica, N. Y., for whom the Smith & Hemenway Company, 296 Broadway, New York, are direct representatives, have put on the market the Samson Cannon Ball Side Cutting Plier here shown, the smaller cut at right showing the reverse side of cutting end. It is 9¼ inches long over all, with a



Samson Side Cutting Plier.

throat ¾ inch in diameter, which will admit any insulated copper cable up to 100 wires without injuring the insulation back from the point cut on either end. This is an operation that in the past has been accomplished by using a bolt cutter, which is cumbersome to carry about. The plier is made from the finest Brescian steel, hardened and tempered in the parts before assembling. There are three finishes, black with polished head, full polished and full polished nickeled.

Imperial Watchman's Clock.

Nanz & Co., 127 Duane street, New York, manufacturers of watchmen's time detectors, have just brought out the Imperial watchman's clock, or watch, illustrated herewith. While designed for use in any kind of factory, mill or other plant, it is peculiarly adapted to such ex-

Fig. 1.—Imperial Watchman's Clock Closed.

acting conditions as are found in chemical works, packing houses, mines, railroad and lumber yards, &c., where the dampness, acids, gases, &c., are so destructive to stationary electrical clocks and wires. This clock has been approved by the National Fire Protection Association for use under the rules of the National Board of Fire Underwriters covering portable watchman's clocks. Fig. 1 shows the clock as carried about, it being 3½ inches in diameter and 1½ inches thick, Fig. 2 being a larger view, illustrating the paper time dial, renewable each day, and the peculiar keyhole, the key itself being seen in Fig. 4 securely held to station box by stout safety chain protected by seals. The strong point of this mechanism is the apparent impossibility of tampering with it, while there is a marking device to register the opening and closing of the clocks. It is said the watchman cannot beat it, even if open, as he is compelled to visit the stations to insert the keys in order to impress the character of each station upon the paper dial in clock. It is pointed out that the key cannot be duplicated, because each one is of a special style and form, each having a small engraved character which must be accurate to fit the matrix within the clock, thus necessitating going to the stations as often as demanded by employers. The clock movement is separated from the marking mechanism, and the dust band is fastened very tightly about the movement to prevent the introduction of dirt or dust. The clock is carried in a leather pouch to protect it from injury, and is guaranteed by the makers to be of the highest grade, the fine move-

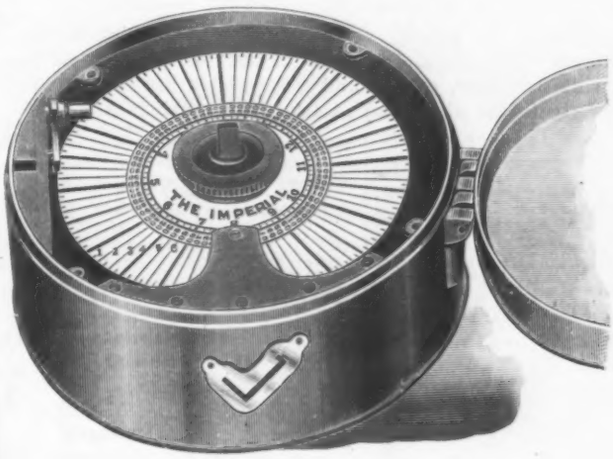


Fig. 2.—Watchman's Clock Open.

ments having heavy plates, jeweled and made like a high grade pocket watch. The keys are noninterchangeable, but can be made interchangeable by special order if for any reason necessary. The clocks are made in two styles,

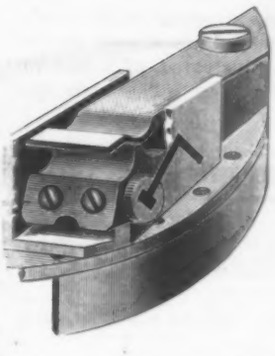


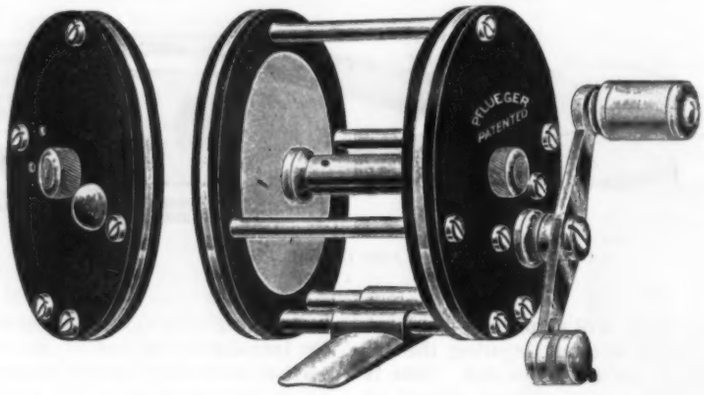
Fig. 3.—Interior of Keyhole Mechanism

Fig. 4.—Station Box and Key.

6 or 12 keys. The solid iron station boxes are 4 x 2 x 2 inches, and well painted for protection from the weather. With each watch is a package of paper dials for a year.

Pflueger Fish Line Reel.

Enterprise Mfg. Company, Akron, Ohio, have put on the market the Pflueger fish line reel, here illustrated, five sizes being made, with a capacity of 150 to 350 yards of line, inclusive. This reel is a multiplier with aluminum interleaved with rubber disks, strengthening them while



Pflueger Fish Line Reel.

reducing the weight, at the same time making a fine finish. Warping and splitting of the rubber is prevented, while bushings, collars and cross plates are secured directly to the aluminum plates. The bearings are phosphor bronze, pivots of Stubs steel, spool, pillars, crank and cross plates of German silver, and the click is back sliding and adjustable. In one of the larger sizes of the reel the crank has a ratchet lock which prevents the crank from getting loose. This reel has a capacity of 300 yards of No. 24 Cuttyhunk line. The side plates are 4½ inches in diameter, formed like the one illustrated, of a disk of aluminum between two of hard rubber. The reels are put up in a chamois lined leather case in a strong card box.

New Wilcox Wire Stretchers.

The Wilcox Mfg. Company, Aurora, Ill., are putting a number of new wire stretchers on the market. One of these, their No. 232, which we illustrate, stretches the wire by working the lever to and fro instead of by one pull. In splicing a wire the machine grips both ends, and as the operator works the lever the ends are drawn together as far as required to make the splice without stopping to take up the slack or getting a new hold. No. 234 works on a somewhat different principle, and has the merit of engaging the wire in advance of the post to which it is secured, enabling the operator to staple the wire at the end of a run or to the corner post without removing the stretcher to a new position. Their No. 233 is a combined tackle block and chain stretcher. By means of a clamp engaging the rope it is possible in this machine, it is stated, to hold the wire at any point, no matter how great the tension. It is locked or unlocked by a slight movement of the rope either to the right or left.

Wilcox Wire Stretcher No. 232.

F. B. Manicure Nail Knife.

The Forquignon Mfg. Company, 13 East Sixteenth street, New York, manufacturers of manicure and pedicure cutlery and supplies, have just put on the market the F. B. special pattern manicure nail knife, here illustrated. It is made in three styles of handles, bone, ebony and pearl, and two lengths of blades, the No. 184 shown in the cut being 5 inches long over all, with 1½-inch blade, and No. 168 5¾ inches extreme length, with 2¾-inch blade. The blades are hand forged and highly tempered and polished, and are designed for cleaning, scraping and lifting the nail and cuticle.

F. B. Manicure Nail Knife.

Current Hardware Prices.

REVISED APRIL 5, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued June, 1903, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
Crystal ... ℔ ton $90@100
Grain ... ℔ ton $120@140
See also *Emery*.

Adjusters, Blind—

Domestic. ℔ doz. $3.00 ... 33⅓%
North's ... 10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent ... 55%
Taplin's Perfection ... 35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Armand Hammer, Wrought ℔ lb 8½@8¾¢
Buel Patent Trenton ... ℔ lb 9½@9¾¢
Eagle Anvils ... ℔ lb 7¼@7¾¢
Hay-Budden, Wrought ... 9@9¼¢
Horseshoe brand, Wrought ... 9@9¼¢

Imported—

Peter Wright & Sons ... ℔ lb 10½¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00 ... 15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Hull Bros. Co ... 30&5%

Augers and Bits—

Com. Double Spur ... 75@75&5%
Boring Machine Augers ... 66⅔@70%
Car Bits, 12-in. twist ... 60@60&10%
Jennings' Pattern ... 50&10&5@60%
Ford's Auger and Car Bits ... 40&5%
Forstner Pat. Auger Bits ... 25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list 25&10%
No. 30. R. Jennings' List. 40&7½&10%
Russell Jennings' ... 25&10&2½%
L'Hommedieu Car Bits ... 15&10%
Mayhew's Countersink Bits ... 45%
Millers' Falls ... 50&10&7½%
Pugh's Black ... 20%
Pugh's Jennings' Pattern ... 35%
Snell's Auger Bits ... 60%
Snell's Bell Hangers' Bits ... 50&10%
Snell's Car Bits, 12-in. twist ... 60%
Wright's Jennings Bits (R. Jennings' list) ... 50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's small, $15; large, $20 ... 50&10%
Clark's Pattern, No. 1, ℔ doz., $26; No. 2, $18 ... 50&10%
Ford's, Clark's Pattern ... 50&10&6%
C. E. Jennings & Co., Steer's Pat. 25&10%
Swan's ... 60%

Gimlet Bits—

Common Double Cut ... gro. $3.00@3.25
German Pattern ... gro. $4.50@4.75

Hollow Augers—

Bonney Pattern, per doz. $10.00@11.00
Ames ... 25&10%
New Patent ... 25&10%
Universal ... 20%
Wood's Universal ... 25%

Ship Augers and Bits—

Ford's ... 40%
Snell's ... 40%
C. E. Jennings & Co.:
L'Hommedieu's ... 15&10%
Watrous' ... 33⅓&10%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled ... gro. $2.75@3.00
Unhandled, Shouldered. gro. 63@66c
Unhandled, Patent ... gro. 66@70c
Peg Awls:
Unhandled, Patent ... gro. $1@1.1c
Unhandled, Shouldered. gro. 63@70c
Scratch Awls:
Handled, Common .. gro. $3.50@4.00
Handled, Socket .. gro. $11.50@12.00
Hurwood ... 40%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality ... $5.50@6.00
Second Quality ... $4.75@5.25

Axle Grease—See *Grease, Axle*

Axles— *Iron or Steel*

Concord, Loose Collar ... 5@5½c
Concord, Solid Collar ... 5@5½c
No. 1 Common ... 4@4½c
No. 1¼ Com. New Style ... 4½@5c
No. 2 Solid Collar ... 4¼@5¼c
Nos. 7, 8, 11 and 12 ... 60&5@60&10%
Nos. 13 to 14 ... 60@5&60&10%
Nos. 15 to 18 ... 60&10@70%
Nos. 19 to 22 ... 60&10@70%

Boxes, Axle—

Common and Concord, not turned ... lb. 4½@4¾c
Common and Concord, turned ... lb. 5@5½c
Half Patent ... lb. 9@9½c

Bait— Fishing—

Hendryx:
A Bait ... 20%
B Bait ... 25%
Competitor Bait ... 40&5%

Balances— Sash—

Caldwell new list ... 50%
Pullman's ... 60%

Spring—

Spring Balances ... 60@60&5%
Chatillon's:
Light Spg. Balances ... 40&10%
Straight Balances ... 40%
Circular Balances ... 50%
Large Dial ... 30%
Pelouze ... 50%

Barb Wire—See *Wire, Barb.*

Bars— Crow—

Steel Crowbars, 10 to 50 lb., per lb ... 3@3½c

Towel—

No. 10 Ideal, Nickel Plate ... ℔ gro, $8.50

Beams, Scale—

Scale Beams, List Jan. 12, '85 ... 40&10%
Chattillon's No. 1 ... 30%
Chattillon's No. 2 ... 40%

Beaters— Carpet—

Western W. G. Co.
No. 1 Electric ... ℔ gro. $7.80
No. 2 Buffalo ... ℔ gro. $9.00
No. 3 Perfection Dust ... ℔ gro. $8.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned ... ℔ doz. $1.20
Holt, No. 1, Tinned ... ℔ doz. $1.50
Holt, No. B, Japanned ... ℔ doz. $2.00
Holt, No. 2, Tinned ... ℔ doz. $2.25
Lyon, No. 2, Japanned ... ℔ doz. $1.25
Lyon, No. 3, Japanned ... ℔ doz. $1.50
Lightning Chain, ℔ gro ... $15.00
National Mfg. Co.: ℔ gro.
No. 1 Dover, Family size ... $7.00
No. 2 Dover, Hotel size ... 14.00
Tapiin Mfg. Co.: ℔ gro.
No. 60 Improved Dover ... $6.00
No. 75 Improved Dover ... 6.50
No. 100 Improved Dover ... 7.00
No. 102 Improved Dover, Tin'd ... 8.50
No. 150 Improved Dover, Hotel ... 15.00
No. 152 Imp'd Dover, Hotel, T'd ... 17.00
No. 200 Imp'd Dover Tumbler ... 8.50
No. 202 Imp'd Dover Tumbler Tin'd 9.50
No. 300, Imp'd Dover Mammoth, ℔ doz ... 25.00
Western, W. G. Co., Buffalo ... 7.00
Wonder (S. S. & Co.) ... ℔ gro. net, $6.00

Bellows—

Blacksmith, Standard List ... 75@75&5%

Blacksmiths'—

Inch..	30	32	34	36	38	40
Each	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length:
Each ... $4.00 4.55 5.10 5.60 6.40 7.50

Molders—

Inch	10	12	15
Doz	$8.50	10.00	13.00

Hand—

Inch	6	7	8	9	10
Doz	$4.25	4.50	5.00	6.50	7.75

Net Prices.

Bells— Cow—

Ordinary goods ... 75&5@75&10%
High grade ... 70&10@70&10&5%
Jersey ... 75&10%
Texas Star ... 50%

Door—

Abbe's Song ... 45%
Barton Gong ... 35%
Home, R. & E. Mfg. Co.'s ... 55&10%
Lever and Pull, Sargent's ... 60&10&10%
Yankee Gong ... 35%

Hand—

Hand Bells, Polished, Brass ... 60& @60&10%
White Metal ... 60%
Nickel Plated ... 50@50&5%
Swiss ... 60@60&7½%
Cone's Globe Hand Bells ... 33⅓@33⅓&10%
Silver Chime ... 33⅓@33⅓&10%

Miscellaneous—

Farm Bells ... lb. 2@2¼
Steel Alloy Church and School ... 60@60&5%
American Tube & Stamp'g Co. Gongs ... 75%
Table Call Bells ... 50&5&10%
Trip Gong Bells ... 55&10&60%

Belting— Rubber—

Agricultural (Low Grade) .. 75@75&5%
Common Standard ... 70@70&10%
Standard ... 65@70%
Extra ... 60&5@60&10%
High Grade ... 50&5@50&10%
Boston Belting Co.:
Seamless Stitched Imperial ... 45&5%
Boston ... 50&5%
Niagara ... 60&5%

Leather—

Extra Heavy, Short Lap ... 60@60&5%
Regular Short Lap 60&10@60&10&10%
Standard ... 70@70&5%
Light Standard ... 70&10%
Cut Leather Lacing ... 60&10%
Leather Lacing Sides, per sq. ft .. 18c

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender ... 40%
Green River Tire Benders and Upsetters ... 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.5. No. 5, $20.50.

Bicycle Goods—

John S. Leng's Son's 1902 list:
Chain ... 50%
Parts ... 50%
Spokes ... 50%
Tubes ... 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—

Common Wooden ... 70&10@75&5%
Hollow Steel Blocks, with Ford's Patent Sheaves ... 50&10%
Lane's Patent Automatic Lock and Junior ... 30%
Stowell's Novelty, Mal. Iron ... 50&10%
Stowell's Self Loading ... 60%
See also *Machines, Hoisting.*

Boards, Stove—

Zinc, Crystal, &c ... 50&10@40&10%

Bolts—

Carriage, Machine, &c.—

Common Carriage ... 70&10@75%
Phila. Eagle, $3.00 list May 24, '99 ... 80@80&5%
Bolt Ends, list Feb. 14, '95 ... 75&5%
Machine ... 75@75&5%
Machine with C & T. Nuts ... 75&5%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch	3	4	5	6	8
Per doz	$0.26	.30	.39	.57	.65

Cast Iron Spring Foot:

Inch	6	8	10
Per doz	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:

Inch	6	8	10
Per doz	$0.57	.80	1.00

Wrt Barrel, Jap'd .75&10@75&10&10%
Wrought " Bronzed .50&5@50&10%
Wrought Flush, B. K. .50&10@60&10%
Wrought Shutter ... 40&10&10@60&5%
Wrought Square Neck ... 50@50&10%
Wrought Sunk, Flush ... 50@50&10%
Ives' Patent Door ... 60%

Stove and Plow—

Plow ... 60&10&10@70%
Stove ... 50&5@30&10&5%

Tire—

Common ... 72½@72½&10%
Norway Iron ... 50@50&5%
American Screw Company:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila. list Oct. 16, '84 ... 82½%
Bay State. list Dec. 28, '99 ... 72½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84 ... 80%
Eagle Phila., list Oct. 16, '84 ... 82½%
Eclipse, list Dec. 28, '99 ... 72½%
Russell, Burdsall & Ward Bolt & Nut Co.
Empire, list Dec. 28, '99 ... 72½%
Norway Phila., list Oct. '84 ... 80%
Unson Nut Co.:
Tire Bolts ... 72½%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch	1¼	1½	1¾	2
Per doz	$4.30	5.00	5.75	7.25
Inch	2¼			2½
Per Doz	$8.65			11.50

Enterprise Mfg. Co., No. 1, $1.35; No. 2, $1.65; No. 3, $2.50 each ... 35%

Boxes, Mitre—

C. E. Jennings & Co ... 25&10%
Langdon ... 15&10%
Perfection ... ℔ doz. $36.00
Schatz ... 40%

Braces—

NOTE.—*Most Braces are sold at net prices.*
Common Ball, American .. $1.15@1.25
Barber's ... 50&10&10@60&10%
Fray's Genuine Spofford s ... 60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 ... 60%
C. E. Jennings & Co ... 50&5&10%
Mayhew's Ratchet ... 60%
Mayhew's Quick Action Hay Patent .. 50%
Millers Falls Drill Braces ... 25&10%
P. S. & W. Co. Peck's Patent 60&10@65%

Brackets—

Wrought Steel ... 80@80&10%
Bradley's Wire Shelf:
Full cases ... 80&10&10%
Broken cases ... 80&10%
Griffin's Pressed Steel ... 80%
Griffin's Folding Brackets ... 70&10%
Stowell's Cast Shelf ... 35%
Stowell's Sink ... 50%
Western, W. G. Co., Wire ... 60&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—

Western, W. G. Co ... 80%
Wire Goods Co ... 70@75&10%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—

Hoosier ... ℔ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts— Brass—

Wrought list Sept., '96 ... 20@30%
Cast Brass, Tiebout's ... 50%

Cast Iron—

Fast Joint, Broad ... 50@50&10%
Fast Joint, Narrow ... 50@50&10%
Loose Joint ... 70&5@70&10%
Loose Pin ... 70&5&10@70&10%
Mayer's Hinges ... 70&5&10@70&10%
Parliament Butts ... 70&5&10@70&10%

Wrought Steel—

Table and Back Flaps ... 75%
Narrow and Broad ... 75%
Inside Blind ... 75&10%
Loose Pin ... 75%
Loose Pin, Ball and Steeple Tip ... 8 &20%
Japanned, Ball Tip Butts .. 70&10%
Bronzed Wrt, Nar. and Inside Blind Butts ... 55&10%

Extra 10@10&10%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series ... 5%
1200 series ... 33⅓%
300, 300, 600 and 900 series ... 40&10%
Hendryx Bronze:
700, 800 series ... 40&10%
Hendryx Enameled ... 40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong ... per lb. .4@4.4c
Sharp, 1 prong ... per lb. 4.4@4.4c
Perkins' Blunt Toe ... cents, ℔ lb .35
Perkins' Sharp Toe ... cents, ℔ lb .45

Can Openers—See *Openers, Can*

Cans, Milk—

	5	8	10 gal.	
Illinois Pattern.	$1 50	2.00	2.25	each.
Iowa Pattern	2.35	2.50	each,	
	30	30	40	qts.
New York Patt'rn	1.65	2.40	2.75	each.
Baltimore Patt'rn	1.80	2.00	each.	

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$48.00	64.20	129.60 gro., net

Caps—Percussion—

Eley's E. B. 60c
G. D ..... *per M* 3½@35c
F. L ..... *per M* 40@45c
G. E ..... *per M* 50@52c
Musket ..... *per M* 62@63c

Primers—

Berdan Primers, $2.00 per M ..... 30&5%
B. L Caps (Sturtevant Shells) $2.00 per M 20%
All other primers per M. $1.52@$1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50 ..... 10&5%
38 C. F., $7.00 ..... 10&5%
22 cal. Rim, $1.50 ..... 10&5%
32 cal. Rim, $2.75 ..... 10&5%
B. B. Caps, Con., Ball Swgd $1.90
B. B. Caps, Round Ball $1.49
Central Fire 25%
Target and Sporting Rifle ..... 15&5%
Primed Shells and Bullets ..... 15&10%
Rim Fire Sporting 50%
Rim Fire, Military ..... 15&5%

Cases, Show—

Sun, No. 102, Silent Salesman, 6 ft., $25.00

Casters—

Bed ..... 70@70&10%
Plate ..... 60&5@60&10%
Philadelphia ..... 75@75&5%
Boss ..... 70&10%
Boss Anti-Friction ..... 70&10%
Gem (Roller Bearing) ..... 75&5%
Martin's Patent (Phoenix) 45%
Smith & Hemenway Co. ..... 33⅓&
Standard Ball Bearing 45%
Tucker's Patent low list 30%
Yale (Double Wheel) low list 45%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	¼	5-16	⅜	7-16	½	9-16
8.00	5.50	4.15	3.75	3.60	3.50	3.45
⅝	¾	⅞	1 to 1¼ inch.			
3.3)	3.25	3.50	3.15	per 100 lb.		

German Coil ..... 60&10&10%

Halters and Ties—

Halter Chains ..... 60&10@60&10&10%
German Pattern Halter Chains, list July 24, '97 ..... 60&10&10@70&10%
Cow Ties ..... 60@60&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-3, Straight, with ring $24.00
6½—6-2, Straight, with ring $24.50
6½—8-2, Straight, with ring $28.00
6½—10-2, Straight, with ring $33.00
Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than Straight Link.
Trace, Wagon and Fancy Chains ..... 60&5@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 70@70&5%
Brass ..... 70@70&5%
Safety Chain ..... 75@75&10&5%
Gal. Pump Chain ..... *lb* 4¼@4¾c
Covert Mfg. Co.
Breast ..... 40&2%
Halter ..... 40&2%
Heel ..... 40&2%
Rein ..... 40&2%
Stallion ..... 40&2%
Covert Sad. Works:
Breast 70%
Halter 70%
Hold Back 70%
Rein 70%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45&50%
Eureka Coil and Halter ..... 45@50&5%
Niagara Coil and Halters ..... 45@50&5%
Niagara Cow Ties ..... 45&5@50&10&5%
Niagara Wire Dog Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain ..... 70&10%
Universal Dbl-Jointed Chain 50%

Chalk—(From Jobbers.)

Carpenters' Blue ..... *gro.* 40c
Carpenters', Red ..... *gro.* 35c
Carpenters', White ..... *gro.* 30c
See also Crayons.

Checks, Door—

Bardsley's 45%
Columbia ..... 50&10%
Eclipse ..... 60&10%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55%
Youths' Chests, with Tools 40%
Gentlemens' Chests, with Tools 30%
Farmers', Carpenters', etc., Chests, with Tools 20%
Machinists and Fitters' Chests, Empty 50%
C. E. Jennings & Co.'s Machinists' Tool Chests ..... 33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List ..... 70@70&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Swan's 70%
L. & I. J. White ..... 30@30&5%

Tanged—

Tanged Firmers ..... 40&5@40&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Nos. 191, 181 ..... 16⅔&10%
L. & I. J. White, Tanged ..... 35&5%

Cold—

Cold Chisels, good quality, lb. 13@15c
Cold Chisels, fair quality, lb. 11@12c
Cold Chisels, ordinary ..... *lb.* 9 @10c

Chucks—

Beach Pat., each $8.00 ..... 35&5%
Pratt's Positive Drive 25%
Empire 25%
Blacksmiths' 25%
Skinner Patent Chucks:
Combination Lathe Chucks 40%
Drill Chucks, Patent and Standard 30%
Drill Chucks, New Model 30%
Independent Lathe Chucks 40%
Improved Planer Chucks 35%
Universal Lathe Chucks 40%
Face Plate Jaws 40%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination 50%
Czar Drill 35%
Combination Geared Scroll 40%
Geared Scroll 40%
Independent 50%
Independent Steel 40%
Union Drill 45%
Universal 50%
Independent Iron Face Plate Jaws 40%
Independent Steel Face Plate Jaws 40%
Westcott Patent Chucks:
Lathe Chucks 50%
Little Giant Auxiliary Drill 45%
Little Giant Double Grip Drill 45%
Little Giant Drill, Improved 45%
Oneida Drill 45%
Scroll Combination Lathe 45%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Cabinet Sargent's ..... 50&10%
Carriage Makers', P., S. & W. Co. 50%
Carriage Makers' Sargent's 60%
Besly, Parallel ..... 33⅓&10%
Linemans' Utica Drop Forge & Tool Co. 40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners, Drain—

Iwan's Champion, Adjustable 55%
Iwan's Champion, Stationary 40%

Sidewalk—

Star Socket, All Steel ..... ₱ doz. $4.05 net
Star Shank, All Steel ..... ₱ doz. $3.24 net
W. & C. Shank, All steel, ₱ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros. 30%
New Haven Edge Tool Co.'s 45%
Fayette R. Plumb ..... 33⅓@33⅓&10%
L. & I. J. White 30%

Clippers—

Chicago Flexible Shaft Company
'98 Chicago Horse ..... $8.75 } 15%
1902 Chicago Horse ..... $10.75 }
20th Century Horse, each, $5.00 ..... 20%
Lightning Belt ..... $15.00 }
Chicago Belt ..... $20.00 } 15%
Stewart's Patent Sheep ..... $18.50 }

Finger Nail Clippers—

Smith & Hemenway Co. ..... doz. net $2.00

Clips, Axle—

Eagle and Superior ¼ and 5-16 inch ..... 70&10%
Norway, ¼ and 5-16 inch ..... 70@70&10%

Cloth and Netting, Wire

—*See Wire, &c.*

Cocks, Brass—

Hardware list:
Compression and Plain Bibbs ..... 65&10@70%
Globe, Kerosene, Racking, &c., Cocks ..... 65&5@70&5%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Walter B. Stevens & Son's list. 40%
Embossed, Gilt, Walter B. Stevens & Son's list ..... 30&10%
Leather, Walter B. Stevens & Son's list 40%

Combs, Curry—

Metal Stamping Co ..... 30&10%

Mane and Tail—

Covert's Saddlery Works ..... 60&10%

Compasses, Dividers, &c.

Ordinary Goods ..... 75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Double 65%
Calipers, Inside or Outside 65%
Calipers, Wing 60%
Compasses 50%

Compressors, Corn Shock—

J. B. Hughes' ₱ doz. $2.50

Conductor Pipe, Galva —

L. C. L. to Dealers:

Territory.	*Nested.*	*Not nested.*
A. Eastern.	75&7½%	75&2½%
B. Eastern	75&10&2½%	75&7½%
Central	75&7½%	75%
Southern	70&10%	70&5%
S. Western	70&7½%	70&2½%

Terms, 60 days, 2% cash, 10 days. Factory shipments generally delivered.
See also *Eave Troughs.*

Coolers, Water—

Gal. each	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	2.40	$3.00	
Gal.	2	3	4	6	8
Galv. Lined Ea.	$1.85	$2.00	$2.2	$2.90	$3.90
					25%

Galv. Lined side handles

Gal.	2	3	4	6	3
Each.	$1.95	$2.15	$2.40	$3.50	$4.15...25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord—Sash—

Braided, Drab ..... *lb.* 35c
Braided, White, Com ..... *lb.* 23@25c
Cable Laid Italian ..... *lb. A,* 18c; *B,* 16c
Common India ..... *lb.* 10@10½c
Cotton Sash Cord, Twisted ..... 20@25c
Patent Russia ..... *lb.* ..@14c
Cable Laid Russia ..... *lb.* ..@15c
India Hemp, Braided ..... *lb* ..@18c
India Hemp, Twisted ..... *lb.* 12@13c
Patent India, Twisted ..... *lb.* 12@13c
Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12 ..... ₱ lb 30 ¢
Anniston, Nos. 7 to 12 ..... ₱ lb 25 ¢
Old Colony, Nos. 7 to 12 ..... ₱ lb 25 ¢
Anniston Drab, Nos. 7 to 12 ..... ₱ lb 30 ¢
Pearl Braided, cotton, No. 6 ₱ lb., 24¢; Nos. 7 to 12 23¢.
Eddystone Braided Cotton, No. 6 ₱ lb 27¢
Harmony Cable Laid Italian. No. 7 to 10 ..... ₱ lb 33¢
Peerless:
Cable Laid Italian ..... 16¢
Cable Laid Russian ..... 14¢
Cable Laid India ..... 12¢
Braided India ..... 18¢
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ₱ lb 36½¢
Braided, Italian Hemp ..... ₱ lb 36¢
Braided, Linen ..... ₱ lb 53¢
Braided, White Cotton or Spot. ₱ lb 34¢
Massachusetts, White ..... ₱ lb 28 ¢
Massachusetts, Drab ..... ₱ lb 32 ¢
Phœnix, White, No's 7 to 12 ..... 24¢
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab ..... 40¢
A quality, White ..... 35¢
B quality, Drab ..... 35¢
B quality, White ..... 30¢
Italian Hemp ..... 40¢
Linen ..... 57½¢

Wire, Picture—

List Oct., '00 ..... 85&10@85&10&10&5%

Cradles—

Grain ..... 40&10 12½%

Crayons—

White Round Crayons, gross 5½@6c
Cases, 100 gro., $4.00, at factory.
D. M. Steward Mfg. Co.
Jumbo Crayons ..... gr. $3.50 }
Metal Workers' Crayons ..... gr. $2.50 }
Soapstone Pencils, round, flat or square ..... gr. $1.50 } Case lots 20%
Rolling Mill Crayons ..... gr. $2.50 }
Railroad Crayons (composition) ..... gr. $2.00 }
Zelnicker's Lumber:
Red, Blue, Green ..... ₱ gro. $6.50
Black ..... ₱ gro. $4.00
See also *Chalk.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden 50%

Cutlery, Table—

International Silver Company:
No. 12 Medium Knives, 1847 ..... ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz. $3.00
Wm. Rogers & Son ..... ₱ doz. $2 50
Simeon L. & Geo. H. Rogers Company:
12 dwt. Medium Knives ..... ₱ doz. $3.00
No. 77 Medium Knives ..... ₱ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co 40%
Red Devil 50%
Smith & Hemenway Co 70%
Woodward 40%

Meat and Food—

American 30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise ..... 25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's, ₱ doz. ..... 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal ..... 40&10@50%
Little Giant, ₱ doz. ..... 33⅓@40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$71.00	$68.00

N. E Food Choppers 40%
New Triumph No. 605, ₱ doz. $24.00 ..... 30&10@40%
Russwin Food No. 1, $24 00; No. 2, $27.00 ..... 45&10&10%
Sterling ..... 40@40&10 %
No 1 ...$5.00 each No. 2 . $2.50 each
Woodruff's, ₱ doz ..... 30&10@40%

Nos	100	150
	$15.00	$18.00

Enterprise Beef Shavers ..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9 ..... 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife ..... ₱ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ₱ doz. $4.00
Sterling $6 00 each 33⅓%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40%
Slaw Cutters, 1 Knife, ₱ gr. ...$18@$20
Slaw Cutters, 2 Knife, ₱ gr. ...$22@$36

Tobacco—

All Iron, Cheap ..... *doz. $4.25@$4.50*
Enterprise ..... 25@50%
National, ₱ doz. No. 1, $21; No. 2, $18.. 40%
Sargent's, ₱ doz. No. 2 ..... 60%
Sargent's No 12 and 21 ..... 60&10%

Washer—

Appleton's, ₱ doz. $16.00 ..... 50&10&10%
Bonney's 33⅓%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz . $9.00
Iwan's Improved Post Hole Auger. 40&5%
Iwan's Vaughan Pattern Post Hole Augers, ₱ doz $6.50
Iwan's Perfection Post Hole Digger, ₱ doz. $8.50
Iwan's Split Handle Post Hole Diggers, ₱ doz $7.50
Kohler's Universal ..... ₱ doz. $15.00
Kohler's Little Giant ..... ₱ doz. $12.50
Kohler's Hercules ..... ₱ doz. $10.00
Kohler's Invincible ..... ₱ doz. $9 00
Kohler's Rival ..... ₱ doz. $8.50
Kohler's Pioneer ..... ₱ doz. $7.50
Never-Break Post Hole Diggers, ₱ doz. $24.00 ..... 60%
Samson, ₱ doz. $34.00 ..... 25%

Dividers—See *Compasses.*

Doors Screen—

Phillips', style E, ¼ in. ..... ₱ doz, $10.50
Phillips', style 077, ¼ in. ..... ₱ doz, $8.00
Phillips', style x-y, ¼ in ..... ₱ doz, $11.00
Porter's Plain, No. 6 ..... ₱ doz. $6 75
Porter's Ornamental, No. 70, ₱ doz. $10.50
Porter's No. 99 ..... $9.00
Porter's No. 44 ..... $10.75

Drawers, Money—

Sun Money Drawers, No. 5, ₱ doz. $9.50; No. 6, with Bell, $10.60; No. 6, with Gong, $10.50.
Tucker's Pat. Alarm Till No. 1, ₱ doz. $18; No. 2, $15; No. 3, $12; No. 4, $18

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill...each $1.50@$1.75
Breast, Millers Falls ..... 15&10%
Breast, P., S. & W ..... 40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 16⅔&10%
Johnson's Drill Points ..... 16⅔&5&10%
Millers Falls Automatic Drills ..... 33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's 33⅓%
Ratchet, Whitney's, P.S. & W 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Bit Stock ..... 60&10@60&10&10%
Taper and Straight Shank ..... 60&10@60&10&5%

Drivers, Screw—

Screw Driver Bits, per doz. ..45@75c
Balsey's Screw Holder and Driver, ₱ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9. .40%
Buck Bros' Screw Driver Bits 30%
Champion 50%
Edson 60%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet 35%
Goodell's Auto 50&10&10@50&10&10&5%
Hurwood 40%
Mayhew's Black Handle 40%
Mayhew's Monarch ..... 40&10%
Millers Falls, Nos. 20 and 21 ..... 25&10%
Millers Falls, Nos. 11, 12, 41, 42 ..... 15&10%
Never Turn 60%
New England Specialty Co. 50%
Sargent & Co.'s:
Nos. 1 and 60 ..... 50&10&10%
Nos. 50 and 55 ..... 60&10%
Nos. 20 and 40 ..... 70&10%
Smith & Hemenway Co ..... 40&5%
H. D. Smith & Co.'s, Perfect Handle ..40%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles 70@60&10&10%
No. 86 ..... 70@70&10&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 25, 35 and 45 ..... 30&10&10%

Eave Trough, Galvanized

Territory.	*L. C. L.*
A. Eastern	80&10%
B. Eastern	80&10&5%
Central	80&10%
Southern	75&16⅔%
S. Western	75&10&5%

Terms, 2% for cash. Factory shipments generally delivered.
See also *Conductor Pipe and Elbows.*

Elbows and Shoes—

Factory shipments 60%
Perfect Elbows (S. S. & Co.) 30%

Emery, Turkish—

	4 to 16	5 to 150	Flour
Kegs	*lb.* 5c	5½c	3½c
½ Kegs	*lb.* 5½c	5¾c	5¾c
Kegs	*lb* 5c	6c	
10-lb cans, 10 in case	6½c	7c	6c
10-lb. cans, less than 10	10c	10c	8c

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—*See Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%
Walling's 50%

Cord and Weight—

Ives 40%

Faucets—

Cork Lined ..... 50@50&10%
Metallic Key, Leather Lined 70@70&10%
Red Cedar ..... 40@40&10%
Petroleum ..... 70@10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60%
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key ..60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined ..50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined..60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection Cedar 40%
McKenna, Brass:
Burglar Proof, N. P 35%
Improved, ¼ and ⅜ inch 35%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36..40&10%

Felloe Plates—

See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.

Brands	*Common*	*Regular*	*Superior*	*Extra*
Best Brands	70&5@70&10&5%			
Standard Brands	75&5@75&10&10%			
Second Quality	75&10@10@80&5%			

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 50%

Fixtures, Grindstone—

Net Prices:

Inch	15	17	19	21	24
Per doz.	$2.75	2.85	3.25	3.75	4.50

P., S. & W. Co ..... 30&10@40%
Reading Hardware Co 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger, Heavy ..... ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light ..... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Base Discounts Aug. 1, 1899, list;
Hay, 2 tine 50c
Boys', & Fish, 2 tine 50c
Hay & Boys', 3 tine 60c
Hay & Boys', 4 tine 66⅔%
Champion Hay 66⅔%
Hay & Header, long 3 tine 65%
Header, 4 tine 65%
Barley, 4 & 5 tine, Steel 60c
Manure, 4 tine 60c
Manure, 5 and 6 tine 66⅔c
Spading 70c
Potato Digger, 6 tine 60c
Sugar Beet 40c
Coke & Coal 40c
Heavy Mill & Street 65%
Iowa Dig-Ezy Potato 65%
Victor, Hay 60%
Victor, Manure 65%
Victor, Header 66⅔%
Champion, Hay 66⅔%
Champion, Manure 60c
Columbia, Hay .....66⅔&5%
Columbia, Manure 70%
Columbia, Spading 70c
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine, $6.00.
W. & C. Potato Digger 60c
Acme Hay 60c
Acme Manure, 4 tine 60c
Dakota Header .....65&5%
Jackson Steel Barley 65c
Kansas Header 66⅔%
W. & C. Favorite Wood Barley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons.*

Fountains, Stock—

Double Dewey .....₱ doz. $13.00

Frames— Saw—

White, Straight Bar, per doz. 75@80c
Red, Straight Bar, per doz $1.00@$1.25
Red, Double Brace, per doz. $1.40@1.50

Freezers Ice Cream—

Qt.	1	2	3	4	6
Each	$1.25	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp $2.75
Cotton 3.20
Waterproof Single Taped 3.85
Waterproof Double Taped 4.40
Waterproof Triple Taped 5.15
10c&25%

Gates, Molasses and Oil—

Stebbins' Pattern .....30c&5@30c&10c&5%

Gauges—

Marking, Mortise, &c. .....50c&10c&5@50c&10c&10c&5%
Chapin-Stephens Co.:
Marking, Mortise, etc. .....50c&10@50c&10&10%
Scholl's Patent .....50c&10@50c&10&10%
Door Hangers .....50c@50c&10%
Fulton's Butt Gauge .....33⅓&10%
Stanley R. & L. Co.'s Butt & Babbet Gauge .....20@20&10&10%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire P., S. & W. Co .....30&10%

Gimlets— Single Cut—

Nail, Metal, Assorted, gro. $1.40@1.50
Spike, Metal, Assorted gro. $2.30@3.50
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $4.25@4.50

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co .....60@60&10&10%

Glue—Liquid Fish—

Bottles or Cans, with Brush .....25@50%
Cans (¼ pts., pts., qts., ½ gal., gal.) .....25@48%
International Glue Co. (Martin's) .....4%&10@50%

Grease, Axle—

Common Grade .....gro. $4.50@5.50
Dixon's Everlasting, 10-₱ pails, ea. 85¢
Dixon's Everlasting, in bxs., ₱ doz. 1 ₱ $1.20; 2 ₱ $2.00

Grips, Nipple—

Perfect Nipple Grips .....40&10&2%

Griddles, Soapstone—

Pike Mfg. Co .....33⅓&33⅓&10%

Grindstones—

Bicycle Emery Grinder $6.50
Bicycle Grindstones, each .....$2.50@3.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz. $2.00
Pike Mower Knife and Tool Grinder, each $6.00
33⅓%
Velox Ball Bearing, mounted, Angle Iron Frames .....each, $3.25

Halters and Ties—

Covert Mfg. Co.:
Web .....45&2%
Jute Rope .....40&5%
Sisal Rope .....40&2%
Covert's Saddlery Works:
Web and Leather Halters 70%
Jute and Manila Rope Halters 70%
Sisal Rope Halters .....60&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties .....60&10%

Hammers—

Handled Hammers—

Heller's Machinists' .....40&10&10&10%
Heller's Farriers .....40&10&40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 .....40@40&10&10%
Peck, Stow & Wilcox .....40&10&5%
Fayette R. Plumb:
Plumb, A. E. Nail .....33⅓&7½@33⅓&10&7½&5%
Engineers' and B. S. Hand .....50&7½&5@50&10&7½&5%
Machinists' Hammers .....50&5@50&10&5%
Riveting and Tinners' .....40&2½@40&10&2½&5%
Sargent's C. S. New List 40%

Heavy Hammers and Sledges—

Under 3 lb. .....lb 50c
3 to 5 lb. .....lb 40c
Over 5 lb. .....lb. 30c
} 80@80&10%
Wilkinson's Smiths' .....9½c@10c lb.

Handles—

Agricultural Tool Handles—

Axe, Pick, &c. .....4 @50&5%
Hoe, Rake, &c. .....45@50&5%
Fork, Shovel, Spade, &c.:
Long Handles .....45@50&5%
D Handles 40%

Cross-Cut Saw Handles—

Atkins' .....40&5%
Champion .....45@45&10%
Disston's 50%

Mechanics' Tool Handle. 75

Auger, assorted .....gro. $2.50@$2.85
Brad Awl .....gro. $1.65@$1.85
Chisel Handles:
Apple Tanged Firmer, gro. ass'd. $2.40@$2.65
Hickory Tanged Firmer, gro. ass'd. $2.15@$2.40
Apple Socket Firmer, gro. ass'd, $1.75@$1.95
Hickory Socket Firmer, gro. ass'd. $1.55 @ $1.60
Hickory Socket Framing, gro. ass'd. $1.60@$1.75
File, assorted .....gro. $1.30@$1.40
Hammer, Hatchet, Axe, &c. 50%
Hand Saw, Varnished, doz .80@85c
Not Varnished .....65@75c
Plane Handles:
Jack doz. 30c; Jack Bolted 75c
Fore, doz. .....45c; *Fore, Bolted.* 90c
Chapin-Stephens Co.:
Carving Tool .....40@40&10%
Chisel .....65c&65&10%
File and Awl .....65c&65&10%
Saw and Plane .....40c&40&10%
Screw Driver .....40c&40&10%
Millers Falls Adj. and Hatchet Auger Handles .....15&10%
Nicholson Simplicity File Handle, ₱ gro .....$0.85@$1.50

Hangers—

NOTE.—*Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.*

Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Single Doz.	$0.90	1.25	1.60	1.95	2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch	3	4	5	6
Single Doz.	$1.30	1.85	2.50	3.00

Extra 5&10% often given.

Alith Mfg. Co.
Reliable No. 1 .....per doz. $12.00
Reliable No. 2 .....per doz. $15.00
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle 60%
Roller Bearing .....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing $4.15
Parlor, Standard $3.35
Parlor, New Model $2.85
Parlor, New Champion $2.25
Barn Door, Standard .....50&10&10&5%
Hinged $6.40
Covered .....50&10&10%
Special .....50&10&10&5%
Lawrence Bros.:
Advance 60%
Cleveland .....60&10%
Crown 60%
Giant .....50&10%
New York 60%
Peerless .....60&10%
Sterling 60%
Swing, No. 95 .....60%
Union, No. 44, $5 00; No. 45 $7.00; No. 46, $9.00.
McKinney Mfg. Co.:
No. 1, Special, $15 .....60&10%
No. 2, Standard, $18 .....60&10%
Hinged Hangers, $16 .....50%
Meyers' Stayon Hangers 60%
C. S. Smith Mfg. Co.:
Lundy Parlor Door .....50&10%
Monarch Barn Door .....60&10%
Never Jump Hinge .....50&10%
Peerless .....60&10%
Perfection .....70&5%
Phœnix .....70&5%
Wagner's Adjustable .....70&10%
Warehouse Anti-Friction 60%
Richards Mfg. Co.:
Pioneer Wood Track No. 3 .....$2.25
Imp'd Wood Track No. 5 .....$2.25
Imp'd Steel Track No. 7 .....$2.70
Imp'd Steel Track No. 7 .....$2.65
Ball Br'g Steel Track No. 9 .....$2.50
Ball Br'g Steel Track No. 10 .....$2.50
Roller Br'g Steel Track No. 11 .....$2.45
Roller Br'g Steel Track No. 12 .....$2.40
Ball Br'g Steel Track No. 13 .....$3.75
Roller Br'g Steel Track No. 14 .....$2.65
Ball Br'g Trolley Track No. 15 .....40%
Ball Brg Trolley Track No. 19 .....40&5%
Ball Bearing Tandem Trolley Track No. 16 .....40%
Silent Adjustable Track No. 18 .....40%
Auto Adjustable Track No. 22 .....40%
Trolley B. D. No. 17 .....$1.60
Trolley F. D. No. 120 .....$2.70
Trolley F. D. No. 121 .....$2.85
Trolley F. D. No. 151 .....$3.00
Roller Bearing D. D. No. 25 .....70&5
Roller Bearing U. S. B. D .....70&5%
Anti Friction B. D .....60&10%
Ives' Wood Track No. 1 .....$2.15
Ives' Imp'd Wood Track No. 2 .....$2.15
Safety Door Hanger Co.:
Storm King Saftey 60%
U. S. Standard Hinge 60%
Stowell Mfg. and Foundry Co.:
Acme Parlor Ball Bearing 40%
Ajax Hinge Door 60%
Apex Parlor Door .....50&10&5%
Atlas 60%
Baggage Car Door 50%
Climax Anti-Friction .....50&10%
Elevator 40%
Express 50%
Freight Car Door 60%
Interstate .....60&10%
Lundy Parlor Door .....50&10%
Magic 60%
Matchless .....60&10%
Nansen .....70&5%
Parlor Door .....53&10%
Railroad .....50&10%
Rex Hinge Door 60%
Street Car Door 50%
Steel, Nos. 300, 404, 500 .....50&10%
Underwriter's Fire Door 40%
Wild West Warehouse Door 50%
Zenith for Wood Track .....50&10%
A. L. Swett Iron Works:
Eagle .....60&10%
Hylo .....50&10%
Perfection 60%
Pilot 40%
Taylor & Boggis Fy Co.'s Kidder's Roller Bearing .....50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing .....60&10%
C. J. Roller Bearing .....60&10%
Cycle Ball Bearing 50%
Dwarf Ball Bearing 40%
Ives, Wood Track .....60&10%
L. T. Roller Bearing .....60&10&5%
New Era Roller Bearing .....50&10%
O. K. Roller Bearing .....60&10&5%
Prindle, Wood Track 60%
Richards' Wood Track 60%
Richards' Steel Track .....50&10%
Spencer Roller Bearing .....60&10%
Tandem Nos. 1 and 2 .....60%
Underwriters' Roller Bearing 40%
Velvet 50%
Wilcox Auditorium Ball Bearing 30%
Wilcox Barn Trolley No. 123 .....40%
Wilcox Elv. Door, Nos 112 and 123 .....50%
Wilcox Elv. Door, No. 132 .....40%
Wilcox Fire Trolley, Roller Bearing 30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century .....50&10&10%
Wilcox O. K. Steel Track 50%
Wilcox O. K. Trolley 50%
Wilcox Trolley Ball Bearing 40%
Wilcox Wideman Narrow Gauge, Ball Bearing 40%
For Track, see *Rail*

Extra 5&10% often given.

Hangers, Garment—

Western, W. G. Co .....70&10%

Gate—

Myers' Patent Gate Hangers, ₱ doz net .4.50

Hasps—

McKinney's Perfect Hasp, ₱ doz 50%

Hatchets—

Regular list .....40@40&10%

Heaters, Carriage—

Clark, No. 3, $2.25; No. 2D, $2.75; No 3x, $4.25; No. 1, $5.50 each 15%
Clark Coal, $0.75 ₱ doz 10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind:
(Victor; National; 1868 O P Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.85	1.75	3.50

Mortise Shutter:
(L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter, (Buffalo, &c.)

No.	1	1½	2
Doz. pair	$0.75	.70	.65

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3 for Brick, $11.50 .....1½%
Parker .....70@75%
Reading's Gravity .....50&5%
Sargent's, Nos. 1, 3, 5, 11 & 13 .....70&10@75%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $1.30; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter .....7 &5%
Acme, Lull & Porter 15%
Queen City Reversible 75%
Stenger's Positive Locking, Nos. 1 & 3 .....70&10%
Shepard's Noiseless, Nos. 60, (5, 55 .....70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 .....75%
1868, Old Pat'n, Nos. 1, 3 & 5 .....75%
Tip Pat'n, Nos. 1, 3 & 5 .....75%
Buffalo Gravity Locking, Nos. 1, 3 & 5 .....75%
Shepard's Double Locking, Nos. 20 & 25 .....70%
Champion Gravity Locking, No. 75 .....75%
Steamboat Gravity Locking, No. 10 .....75%
Pioneer, Nos. 060, 45 & 5½ 75%
Empire, Nos. 101 & 103 .....70%
W. H. Co.'s Mortise Gravity Locking, No. 2 .....60%
Whipple's Patent Automatic 30%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	$1.40	2.05	3.80
Latches only	.70	.70	.35

New England:
With Latch .....doz .....@$2.00
Without Latch .....doz. .....@$1.60
Reversible Self-Closing:
With Latch .....doz. .....@$1.75
Without Latch .....doz. .....@$1.35
Western:
With Latch .....doz. $1.75
Without Latch .....doz. $1.15
Wrightsville H'dware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Spring Hinges—

Holdback Cast Iron gro. .....$9.00@9.50
Non-Holdback, Cast iron .....gro. $8.00@8.50
J. Bardsley
Bardsley's Non-Checking Mortise Floor Hinges 45%
Bardsley's Patent Checking 15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges 40%
Bommer Spring Hinges 40%
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor Hinge 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hdw. Co.:
Acme, Wrt. Steel 30%
Acme, Brass 25%
American 30%
Columbia, No. 14 .....₱ gr. $9.00
Columbia, No. 18 .....₱ gr. $35.00
Columbia, Adjustable, No. 7, ₱ gr. $12.00
Gem, new list 30%
Clover Leaf .....₱ gr. $12.50
Oxford, new list 30%
Lawson Mfg. Co.:
Matchless 35%
Matchless Pivot 45%
Shelby Spring Hinge Co.:
Crown Jamb Hinge 40%
Chief Ball Bearing Floor Hinge 45%
Royal Ball Pearing Floor Hinge 45%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr $12.50
Ideal, No. 4 .....₱ gr. $9.00
New Idea No. 1 .....₱ gr. $9.00
New Idea, Double Acting 35%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges .....80c&5%
Heavy Strap Hinges .....80c&20c&10%
Light T Hinges .....75c&10c&5%
Heavy T Hinges .....75c&5%
Extra Heavy T Hinges .....80c&20%
Hinge Hasps 70%
Cor. Heavy Strap .....80c&20c&10%
Cor. Ex. Heavy T .....80c&20%
Ex. 10c&5@10c&10&5%

Screw Hook and Strap.
6 to 12 in .....lb. 3¼c
14 to 20 in .....lb. 3 c
22 to 36 in .....lb. 2¾c

Screw Hook and Eye:
¾ to 1 inch .....lb. 6 c
1½ inch .....lb. 7 c
1¾ inch .....lb. 9 c

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers 35%

Hods, Coal—

	15	16	17	18 inch.
Galv. Open	$2.50	2.75	3.00	3.25 ₱ doz.
Jap. Open	$2.00	2.25	2.50	2.75 ₱ doz.
Galv. Funnel	$3.00	3.25	3.50	3.75 ₱ doz.
Jap. Funnel	$2.50	2.75	3.00	3.25 ₱ doz.

Masons, Etc.—

Cleveland Wire Spring Co.:
Steel Mortar .....each $1.45
Steel Brick .....each $1.20

Hoes— Eye—

Scovil and Oval Pattern .....60c&10@60c&10c&10%
Grub, list Feb. 23, 1899 .....70c&10@75%
D. & H. Scovil 35%

Handled—

Aug. 1, 1899, List:
Field and Garden .....70c&10%
Smith's Patent 50%
Meadow & Rhode Island 75%
Black Diamond .....70c&10%
Mortar and Street .....70c&10c&10%
Planters' .....75c&12½&5%
Cotton .....70c&10c&10%
Cotton Chopper .....75c&12½&5%
Weeding Hoes .....66⅔&15%
Steel Weeders .....66⅔&15%
Malleable Weeders .....66⅔&15%
Ft. Madison Cotton Hoe .....75&7½%
Ft. Madison Crescent Cultivator Hoe Per doz .....75&10%
Ft. Madison Mattock Hoes:
Regular Weight .....₱ doz. $5.00
Junior Size .....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4 60
Ft. Madison Dixie Tobacco Hoe .....75&20%
Kretsinger's Cut Easy .....70&10%
Warren Hoe 55%
W. & C. Ivanhoe .....75&2%
B. B. 6 in., Cultivator Hoe $3.15
B. B., 6½ in $3.35
Acme Weeding .....₱ doz., net, $4.35
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₱ doz. $24.00 .....45&10%

Door—

Empire 50%
Bardsley's 45%

File and Tool—

Nicholson File Holders and File Handles .....33⅓&10&10%

Hooks—

Hooks, Bench, see *Stops, Bench.*

Cast Iron—

Bird Cage, Reading .....50&10%
Bird Cage, Sargent's List 60%
Ceiling, Sargent's List .....50&10%
Clothes Line, Reading List 50%
Clothes Line, Sargent's List .....50&20&10%
Coat and Hat, Sargent's List .....50&5&10%
Clothes Line, Stowell's 70%
Coat and Hat, Reading 50%
Coat and Hat, Stowell's 70%
Coat and Hat, Wrightsville 65%
Harness, Reading List .....50&10%
Harness, Stowell's 60%
School House, Stowell's 70%

Wire—

Belt .....80c&10%
Wire C. & H. Hooks .....75@75c&10%
Atlas, Coat and Hat:
Single Cases 70%
10 Case Lots .....70&10%
Columbian Hdw Co. Gem .....6%&10%
Parker Wire Goods Co.: King .....70&10%
Western W. G. Co. Molding 75%

Wire Goods Co:
Acme ..... 60&10%
Chief 70%
Crown ..... 70&10%
Czar 65%
V Brace ..... 70&10%
Czar Harness ..... 50&10%

Wrought Iron—
Box, 6 in., per doz. $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton ..... doz. $1.05@1.25
Wrought Staples, Hooks, &c.—
See *Wrought Goods.*

Miscellaneous—
Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50

Grass.. ..Nos.	*1*	*2*	*3*	*4*
Best	*$1.50*	*1.75*	*2.00*	
Common	*$1.30*	*1.50*	*1.60*	

Potato and Manure ..... 60@15%
Whiffletree ..... lb. 5¾@6c
Hooks and Eyes:
Brass ..... 60@10@10@70%
Malleable Iron ..... 70@5@70@10%
Covert Saddlery Works' Self Locking Gate and Door Hook 60%
Ft. Madison Cut-Easy Corn Hooks, ₩ doz. $5.25 net
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*

Horseshoes—
See *Shoes, Horse.*

Hose Rubber—
Garden Hose, ¾-inch:
Competition ..... ft. 5½@ 5 c
3-ply Standard ..... ft. 6½@ 7 c
4-ply Standard ..... ft. 7½@ 8 c
3-ply extra ..... ft. 8½@ 9 c
4-ply extra ..... ft. 10 @10½c
Cotton Garden, ¾-in., coupled:
Low Grade ..... ft. 6 @7 c
Fair quality ..... ft. 8 @9 c

Irons—
Sad—
From 4 to 10 ..... lb. 2¾@3 c
B. B. Sad Irons ..... lb. 3¼@3¼c
Chinese Laundry ..... lb. 4¼@5c
Chinese Sad ..... lb. 4@4¼c
Mrs. Potts', per set:

Nos.	*50*	*55*	*60*	*65*
JapdTops	*71*	*68*	*81*	*78*
TindTops	*74*	*71*	*84*	*81*

New England Pressing lb.. 3¼@4c

Pinking—
Pinking Irons ..... doz. 50@60c

Soldering—
Soldering Coppers 2½ and 3.. 19@20c
1½ and 2 ..... 21@22c

Jacks Wagon—
Covert Mfg. Co.:
Auto Screw ..... 30&5%
Steel ..... 45&2%
Covert's Saddlery Works':
Daisy ..... 60&10%
Victor ..... 60&10%
Lockport 50%
Lane's Steel ..... 30&10%

Kettles—
Brass, Spun, Plain ..... 20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c 30%
Smith & Hemenway Co ..... 40&10%
Wilkinson Shear & Cutlery Co 50%
Hay and Straw—See *Hay Knives.*

Corn—
Withington Acme, ₩ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List ..... 70&5@70@10%
Bradley's 35%
C. E. Jennings & Co. Nos. 45, 46 ..60&10%
Jennings & Griffin. Nos. 51, 52, 60 &10&10%
Swan's ..... 70&10&25%
Watrous ..... 16⅔&10%
L. & I. J. White ..... 20&5@25%

Hay and Straw—
Lightning ..... ₩ doz. $6.50@7.00
Iwan's Sickle Edge ..... ₩ doz. $10.00
Iwan's Serrated ..... ₩ doz. $10.00
Maine ..... ₩ doz. $8.50

Mincing—
Buffalo ..... ₩ gro. $13.00

Miscellaneous—
Farriers' ..... doz. $3.00@3.25
Wostenholm's ..... ₩ doz. $3.00@3.25

Knobs—
Base, 2¼-inch, Birch, or Maple, Rubber tip, gro ..... $1.10@1.15
Carriage, Jap, all sizes.. gro. 40@45c
Door, Mineral ..... doz. 65@70c
Door, Por. Jap'd ..... doz. 70@75c
Door, Por. Nickel .... doz. $2.05@2.15
Bardsley's Wood Door, Shutter, &c... 15%
Picture, Sargent's ..... 60&10&10%

Lacing Leather—
See *Belting Leather.*

Ladders, Step, Etc.—
Lane's Store 25%
Myers Noiseless Store Ladders 50%

Ladies' Melting—
L. & G. Mfg. Co, Low List 25%
P. S. & W 50%
Reading 60%
Sargent's ..... 45&10%

Lanterns—Tubular—
Regular Tubular No. 0. doz. $4.35@4.75
Lift Tubular.. No. 0.. doz. $4.75@5.25
Hinge Tubular. No. 0.. doz. $4.75@5.25
Other Styles ..... 50@10@40@10@5%

Bull's Eye Police—
No. 1, 2¾ inch ..... $2.50@2.75
No. 2, 3 inch ..... $2.75@3.00

Lasts and Stands Shoe—
Stowell's Atlas, Malleable Iron 50%
Stowell's Badger, Cast Iron 50%

Latches—
Thumb—
Roggin's Latches, with screw. dz 35@40c

Leaders Cattle—
Small ..... doz. 55c; large, 60c
Covert Mfg. Co ..... 15&2%

Lifters, Transom—
R. & B. 33⅓%

Lines—

Wire Clothes, Nos...	*18*	*19*	*20*
100 feet	*$2.20*	*2.00*	*1.65*
75 feet	*$1.80*	*1.70*	*1.30*

Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3 ..... 40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00: No. 3, $7.50 ₩ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4 $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50 ..... 20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 ..... 30%
Clothes Lines, White Cotton: 50 ft., $3.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft. $5.25 ..... 20%
Anniston Waterproof Clothes, 50 ft., ₩ gro.: $36.00; Gilt Edge, $24.00; Air Line $24.00; Acme, $19.00; Alabama, $17.00; Empire, $18.00; Advance, $15.00; Oriole, $22.00; Albermarle, $15.00; Eclipse, $13.50; Chicago, $12.50; Standard, $11.00; Columbia, $9.50.

Locks—Cabinet—
Cabinet Locks ..... 33⅓@33⅓@7½%

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading Hardware Co 50%
R. & E. Mfg. Co 40%
Sargent & Co ..... 40&10%
Stowell's Steel Door Latches 50%

Elevator—
Stowell's 50%

Padlocks—
Wrought Iron ..... 75&10&5@80&5%
R. & E. Mfg. Co. Wrt. Steel and Brass ..... 75@75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass 62½%
Crescent 50%
Iron 62½%
Wrought Bronze and Brass 55%
Wrought Steel 55%
Reading ..... net 50%

Machines—
Boring—
Com. Upright, Without Augers.. $2.00
Com. Angular, Without Augers .$2.25
Without Augers.

R. & E. Mfg. Co.:	Upright.	Angular.
Improved No. 3.	$4.25	No. 1. $5.00
Improved No. 4.	3.75	No. 2. 3.38
Improved No. 5.	2.75	
Jennings'.. No. 4,	3.15	No. 1, 3.50
Millers' Falls		5.75
Snell's, Rice's Pat.	2.50	2.75

Corking—
Reisinger Invincible Hand Power ..... ₩ doz. $48.00

Fence—
Williams' Fence Machines ..... each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block 30%
Moore's Hand Hoist, with Lock Brake. 30%

Ice Cutting—
Chandler's ..... 15&10%

Washing—
Boss Washing Machine Co.: Per doz.
Boss No. 1; Boss Rotary $57.00
Boss No. 7; Dietz Rotary $60.00
Champion Rotary; Banner No. 1.. $54.00
Standard Champion No. 1 ..... $48.00
Standard Perfection $26.00
Cinti Square Western $30.00
Uneeda American, Round $29.00

Mallets—
Hickory ..... 45&5@50%
Lignumvitæ ..... 45&5@50%
Tinners', Hickory and Applewood, doz ..... 50@55c

Mashers, Vegetable—
Western, W. G. Co., Potato ..... 60&10%

Mats—Door—
Elastic Steel (W.G. Co.) 10%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk*

Mills—Coffee, etc.—
Enterprise Mfg. Co ..... 25@30%
National, list Jan. 1, 1902 ..... 30%
Parker's Columbia & Victoria. 50&10&60%
Parker's Box and Side ..... 50&10&60%
Sun, No. 1089, 1 lb mill ..... ₩ doz. $3.00
Swift, Lane Bros Co 30%

Mowers, Lawn—
Net prices are generally quoted.
Cheap ..... all sizes. $1.75@3.00
Good ..... all sizes, $2.25@2.50

	10	*12*	*14*	*16-inch*
High Grade	*4.25*	*4.50*	*4.75*	*5.00*

Continental ..... 60&5%
Great American 70%
Great American Ball Bearing, new list. 70%
Quaker City 70%
Pennsylvania ..... 60&5%
Pennsylvania, Jr., Ball Bearing 60%
Pennsylvania Golf 50%
Pennsylvania Horse ..... 33⅓&5%
Pennsylvania Pony ..... 40&5%
Philadelphia:
Styles M., S., C., K. T. ..... 70&5%
Style A, all Steel ..... 60&5%
Style E, High Wheel ..... 70&10&5%
Drexel and Gold Coin, low list... 40&5%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899 .. 85@10@10@90%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	*6*	*7*	*8*	*9*	*10*	
A. C.	25	23	22	21	21	..40&5%
C. B. K.	25	23	22	21	21	..40%
Anchor	23	21	20	19	18	..60&5%
Champ'n.	28	26	25	24	23	..50%
Coleman	18	12	12	11	11	..net
Maud S.	25	23	22	21	21	..50%
New Haven	23	21	20	19	18	..40&5%
Putnam	23	21	20	19	18	..33⅓%
New Pim'm	19	18	17	16	16	..10&10%
Western, per lb						8½c

Jobbers' special brands, per lb. 8@8½c

Picture—

	1¼	*2*	*2½*	*3*	*3½ in.*
Brass Head.	*.55*	*.60*	*.70*	*.95*	*1.00 gro.*
Por. Head	*1.10*	*1.10*	*1.10*		*.. gro.*

Nippers, See *Pliers and Nippers.*

Nuts—
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain $5.10
Hexagon, plain $5.60
Square, C. T. & R $5.30
Hexagon, C. T. & R $6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank $6.00
Hexagon Blank $6.50
Square Tapped $6.00
Hexagon Tapped $6.50

Oakum—
Best or Government ..... lb. 6¼c
Navy ..... lb. 5¾c
U. S. Navy ..... lb. 5¾c
Plumbers' Spun Oakum 8¾c
In carload lots ¼c lb. off f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper ..... 50&10%
Tin or Steel ..... 70&10@75%
Zinc ..... 65&10%
Chase or Paragon:
Brass and Copper ..... 45&10@50%
Tin or Steel ..... 75@75&10%
Zinc 65%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₩ doz. 20%
Malleable, Hammers' Old Pattern, same list ..... 50&10%
American Tube & Stamping Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers etc, ... 60@60&10%

Openers—Can—
French ..... doz. 35c
Iron Handle ..... doz. 25@27c
Sprague, Iron Hdle.. per doz. 35@40c
Sardine Scissors... doz. $1.75@$3.00
Marvel ..... per doz. $1.25
National 50%
Stowell's Sprague ..... per doz. 35@45c
Tip Top ..... per doz. $0.75
Triumph Shear ..... ₩ gro. $9.00

Egg—
Nickel Plate ..... per doz., $2.00
Silver Plate ..... per doz., $4.00

Packing—
Asbestos Packing, Wick and Rope, 14½@15c lb.

Rubber—
Sheet, C. I ..... 8@10c
Sheet, C. O. S ..... 9@15c
Sheet, C. B. S ..... 10@14c
Sheet, Pure Gum ..... 50@65c
Sheet, Red ..... 40@50c
Jenkins' Standard, ₩ lb 80¢ ... 25@25&5%

Miscellaneous—
American Packing ..... 7@10c lb.
Cotton Packing ..... 16@25c lb.
Italian Packing ..... 9@12½c lb.
Jute ..... 4@4½c lb.
Russia Packing ..... 8@11c lb.

Pails—Creamery
S. S. & Co., with gauges.. No 1 $6.25; No. 2, $5.50 ₩ doz.

Galvanized—
Price per doz.

Quart	*10*	*12*	*14*
Water, Regular	*1.50*	*1.75*	*2.00*
Water, Heavy	*2.75*	*3.00*	*3.25*
Fire, Rd, Bottom	*2.30*	*2.60*	*2.80*
Well	*2.25*	*2.50*	*2.75*

Pans—Dripping—
Standard List ..... 60c&10@60&10c&5%

Fry—
Common Lipped:

No.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.85*	*1.00*	*1.10*	*1.30*	*1.50*

Roasting and Baking—
Regal, S. S. & Co., ₩ doz., Nos. 5, $4.50; 10 $5.25; 20, $5.75; 30, $6.25.
Savory, ₩ doz., net, Nos. 300, $9.00; 400, $15.00.
Simplex, ₩ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper—

Asbestos:	*lb.*
Building Felt	*2¾c*
Mill Board, sheet, 40 x 40 inches	*3½c*
Mill Board, roll, thicker than 1-16 inch	*3½c*
Mill Board, roll, 1-16 in. thick and less	*2½c*

	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 25 lbs. to roll	*$0.40@0.45*
Medium wt., 30 lbs. to roll	*$0.45@0.50*
Heavy wt., 40 lbs. to roll	*$0.65@0.70*

Black Water Proof Sheathing, 500 Sq. ft., 1 ply, 65c; 2 ply, 85c; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton $41.00
Red Rope Roofing, 250 sq. feet per roll $1.75
NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.
1 ply (roll 200 sq. ft.), ton.. $32.50@35.50
2 ply, roll 108 sq. ft ..... 55@60c
3 ply, roll 108 sq. ft ..... 78@80c
Slater's Felt (roll 500 sq. ft.).. .. 75c
NOTE.—*Above prices often include delivery, and are for Eastern territory, where prices are controlled by agreement between the manufacturers. In open territory much lower prices are current.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.00

Sand and Emery—
Flint Paper and Cloth .. 50c&10@60%
Garnet Paper and Cloth 25%
Emery Paper and Cloth.. 50&10@60%

Parers—Apple—
Advance ..... ₩ doz. $4.50
Baldwin ..... ₩ doz. $5.00
Bonanza Improved ..... each $6.50
Daisy ..... ₩ doz $4.00
Dandy ..... each $7.50
Eureka Improved ..... each $20.00
Family Bay State ..... ₩ doz. $15.00
Improved Bay State ..... ₩ doz. $36.00
Little Star ..... ₩ doz. $5.00
New Lightning ..... ₩ doz. $7.50
Reading 72 ..... ₩ doz. $4.00
Reading 78 ..... ₩ doz. $7.00
Rocking Table ..... ₩ doz. $6.00
Turn Table '98 ..... ₩ doz. $6.75
White Mountain ..... ₩ doz. $6.00

Potato—
Saratoga ..... ₩ doz. $7.00
White Mountain ..... ₩ doz. $6 00

Picks and Mattocks—
List Feb. 23, 1899 ..... 70&10@75%

Pinking Irons—
See *Irons, Pinking.*

Pins—Escutcheon—
Brass ..... 60@60@10%
Iron, list Nov. 11, '85.. .. 60@60@10%

Pipe, Cast Iron Soil—
Standard, 2-6 in ..... 50&10
Extra Heavy, 2-6 in 65%
Fittings 70%

Pipe, Merchant,
Steel Carload Lots, f.o.b, Pittsburgh.

Merchant Pipe.	*Black.*	*Galvanized.*
⅛, ¼, ⅜ inch	*68%*	*58%*
½ inch	*71%*	*61%*
¾ to 6 inch	*75%*	*65%*
7 to 12 inch	*71%*	*61%*

Pipe, Sewer—
Jobbers' Prices—
Standard Pipe and Fittings, 2 to 24 in.
New England 67%
New York and New Jersey 70%
Maryland, Delaware, East Penn. 72%
West Penn and West Va 73%
Virginia 75%
Ohio, Michigan and Ky 75%
Indiana 77%
Carload lots are generally delivered.

Pipe, Stove—
Edwards' Nested Stove Pipe:

	C. L.	L. C. L.
5 in., per 100 joints	$7.50	$8 50
6 in., per 100 joints	8.10	9.00
7 in., per 100 joints	9.00	10.00

Planes and Plane Irons—
Wood Planes—
Bench, First quality ..... 40c&5@40c&10%
Bench, Second qual ..... 50c&5@50c&10%
Molding ..... 33⅓c&5@33⅓c&10%
Bailey's (Stanley R. & L. Co) 5&10@25&10&10%
Chapin-Stephens Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Toy and German ..... 40@40&10%
Gage Self Setting 35%
Union 60%

Iron Planes—
Bailey's (Stanley R. & L. Co) ..... 25&10@25&10&10%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 20&10@20&10&10%
Sargent's ..... 60@50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons ..... 30c&5@30&10%
Buck Bros 30%
Chapin-Stephens Co ..... 30@30&10%
Stanley R. & L. Co ..... 20&10@20&10&10%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand.
Kohler's Eclipse ..... ₩ doz. $8.50

Plates—
Felloe ..... lb. 3¾@4c
Self-Sealing Pie Plates (S. S. & Co.), ₩ doz. $2.00 ..... 50%

Pliers and Nippers—
Button Pliers ..... 75@75c&10%
Gas Burner, per doz., 5 in., $1.35@ $1.50; 6 in., $1.45@$1.50

Gas Pipe..	*7*	*8*	*10*	*12-in.*
	$2.00	*$2.25*	*$3.00*	*$3.75*

Acme Nippers ..... 50@50&5%
Bernard's:
Cutting Nippers 33⅓%
Parallel, Pliers 33⅓%
Paragon Pliers 50%
Lodi Pliers 50%
Elm City Fence Pliers 33⅓%
Cronk & Carrier Mfg. Co.:
American Button ..... 75&10%
Cronk's 60%
Improved Button ..... 70&10%
Stub's Pattern 50%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers, and Tools 40&10@40&10&10%
P., S. & W. Tinners' Cutting Nippers, 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—
Chapin Stephens Co.:
Plumbs and Levels ..... 30@30&10&10%
Chapin's Imp. Brass Cor ..... 40@40&10&10%
Pocket Levels ..... 30@30&10&10%
Level Glasses ..... 60@60&10&10%
Disston's Plumbs and Levels 70%
Disston's Pocket Levels 70
C. E. Jennings & Co.'s Iron ..... 25&10%
C. E. Jennings & Co.'s Iron, Adjustable. 33⅓&10%
Stanley R. & L. Co .. 50&10@50&10&10%

Stanley's Duplex.....20@20&10&10%
Woods' Extension.....33⅓&

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz., No. 1, $6.00; No. 2, $8.00; No. 3, $9.00; No. 4, $12.00.....50%
Points, Glaziers'—
Bulk and 1 lb. papers.....lb. 6¼c
½-lb. papers.....lb. 6¾c
¼-lb. papers.....lb. 6¼c

Pokes, Animal—

Ft. Madison Hawkeye.....₱ doz. $3.25
Ft. Madison Western.....₱ doz. $4.00

Police Goods—

Manufacturers' Lists.....25@25&5%
Tower's.....25%

Polish—Metal—

Prestoline Liquid, No. 1 (½ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.75.....40%
Prestoline Paste.....40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ lb boxes, ₱ doz. $1.35; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ₱ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans ... ₱ lb 10¢
Black Eagle, Liquid, ½ pt. cans ₱ doz. 75¢
Black Jack Paste, ¾ lb cans, ₱ gro. $9.00
Black Kid Paste, ¾ lb can.....each, $0.65
Ladd's Black Beauty, gr. $10.00.....50%
Joseph Dixon's, ₱ gr. $5.75.....10%
Dixon's Plumbago.....₱ lb 8¢
Fireside.....₱ gr. $2.50
Gem, ₱ gr. $4.50.....10%
Japanese.....₱ gr. $3.50
Jet Black.....₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.....₱ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....₱ doz. $1.00
Black Silk, 5 oz. box.....₱ doz. $0.75
Black Silk, ½ pt. liq.....₱ doz. $1.00

Poppers, Corn—

1 qt., Square.....gro. $9.00
1 qt., Round.....gro. $10.00
1½ qt., Square.....gro. 11.00
2 qt., Square.....gro. 13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 8 ft., 48¢.
Steel Hitching Posts, each.....$1.30

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, ½ lb. each.....45¢
Fine Sporting, 1 lb. each.....75¢
Rifle, ½-lb. each.....15¢
Rifle, 1-lb. each.....25¢
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50
King's Smokeless: Shot Gun Rifle
Keg (25 lb bulk)..... $12 00 $15.00
Half Keg (12½ lb bulk) 6.25 7.75
Quarter Keg (6¼ lb bulk) 3.25 4.00
Case 24 (1 lb cans bulk)..14.00 17.00
Half case 12 (1 lb cans bulk)7.25 8 75
Robin Hood smokeless Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%
Sensible.....33⅓%
2 qt., $2.00; 4 qt., $4.00; 10 qt., $6.00 each.

Seal Presses—

Morrill's No. 1, per doz. $20.00.....50%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Cyclops.....50%
Dudly improved Nail Puller.....50%
Miller's Falls, No. 3, per doz. $12.00.....33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $3.00.....50%
Pelican, ₱ doz. $9.00.....40&10%
Scranton, Case Lots:
No. 4 B (large).....$5.50
No. 3 B (small).....$3.00
Smith & Hemenway Co.:
Alax.....60%
Diamond B, No. 2, ca e lots, ₱ doz $9.00
Diamond B, No. 3, case lots, ₱ doz $5.50
Eureka.....30%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15.....40%
Yankee.....66⅔&5%

Pulleys—Single Wheel—

Inch	2	2¼	3
Awning, doz	$0.55	.85	1.15

Hay Fork, Swivel or Solid Eye, doz., 4 in, $1.15; 5 in., $1.40

Inch	2	2¼	2½
Hot House, doz	$0.70	.90	1.35

Inch	1¼	1½	1¾	2
Screw, doz	$0.16	.19	.23	.30

Inch	1¼	2	2¼	2½
Side, doz	$0.30	.40	.55	.65

Inch	1½	1¾	2	2½
Tackle, doz	$0.30	.42	.58	1.00

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction...60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¼ and 2 in., 16@19c
Auger Mortise, no Face Plate, per doz. 1¾ and 2 in.....16@19c
Auger Mortise, with Face Plate, per doz., 1¾ and 2 in.....16@19c
Acme.....1¾ in., 16¢; 2 in., 19¢
Common Sense, 1¾ in.... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz 50%
Grand Rapids All Steel Noiseless.....50%
Ideal.....70&5%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern.....60@&6 &10%
Pitcher Spout.....80@&80&10%
Wood.....50@50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00

Inch	3	3¼	3½	3¾	4
	$3.30	3.60	3.85	4.10	4.40

Plunger Cup Leathers—Per 100:

Inch	2½	3	3½	4
	$2.75	3 85	5.00	6.00

Barnes Dbl. Acting (low list).... 50&10%
Contractors' Rubber Diaphragm No. 2 B. & L. Block Co.....$16.00
Daisy Spray Pump.....₱ doz. $7.20
Flint & Walling's Fast Mail (low list).55%
Flint & Walling's Pitcher Spout.....80%
National Specialty Mfg. Co., Measuring.....30%
Mechanical Sprayer.....$7.20
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Punches—

Saddlers' or Drive, good, doz. 65@70c
Spring, single tube, good quality.....$1.75@2.00
Revolving (4 tubes)...doz. $3.50@3.75
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Benard Spring Belt Punches.....33⅓%
Lodi Spring Belt Punches.....50%
Morrill's No. 1 (A.B.C.) ₱ doz., $15.00..50%
No. 2, ₱ doz. $22.50.....50%
Hercules, each $7.50.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Paragon Spring Belt Punches.....50%
Steel Screw, B & K. Mfg Co.....40%
Tinners' Hollow, P. S. & W. Co.35@35&5%
Tinners' Solid, P. S. & W. Co., ₱ doz... $1.44.....60%

Rail— Barn Door, &c.—

Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:

	½	⅝	¾ in.
	$1.70	$2.10	$3 00 100 feet

Angular for Sq. Groove Wheels:

	Small.	Med.	Large.
	$1.50	1 90	2.60 100 feet.

Sliding Door, Iron Painted..2 ¼@2¼c
Sliding Door, Wrought Brass, 1¼ in.....lb.36c...30%
Allith Mfg. Co., No. 1, Reliable Hanger Track, ₱ foot.....8¢
Allith Mfg. Co., No. 2, Reliable Hanger Track, ₱ foot.....10¢
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....9¼¢
Lane's Hinged Track, ₱ 100 ft., 1 in., $3.70; 1¼ in., $4.40.
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.90; 1¼ inch, $4.60.
Lanes' Standard, 1¼ in., ₱ 100 ft 4.00
Lawrence Bros., ₱ ft. 11¢.....60%
Lawrence Bros. New York.....3½¢
McKinney's Hinged Hanger Rail ₱ foot, 11¢.....50%
McKinney's None Better.....₱ ft. 8¾¢
McKinney's Standard .....₱ ft. 4 ¢
Myers' Stayon Track .....30&10%
Safety Door Hanger Co.'s Storm King Safety.....60%
Safety Door Hanger Co.'s U.S. Standard 60%
Smith's Wrought Bracket, Plain.....3½¢
Smith's Special .....4½¢
Smith's Never Jump, per ft. 11¢.....50%
Smith's Plain Steel 30%
Smith's Milled Steel.....4½¢
Stowell's Cast Rail .....₱ ft. 13½¢
Stowell's Steel Rail, Plain.....25%
Stowell's Wrought Bracket, 13-16 in.... ₱ ft. 3¢
Stowell's Wrought Bracket, 1¼x5-16.... ₱ ft. 7¢
Swett's Hylo, per ft. 11¢.....50&10%
Swett's P. L. B. Steel Rail, ₱ 100 ft. $3.00

Rakes—

Net Prices, Malleable Rakes:

	10	12	14	16-tooth
Shank	$1.50	1.60	1.75	1.85
Socket	$1.65	1.80	1.95	2.10

Steel, Garden and Gravel, Aug. 1, '99 List 70%
Weldless Steel .....75&5%
Malleable Iron, Garden.....70&10%
Lawn Rakes, Metal Head, per doz., 20 teeth.....$3.25@3.50
24 teeth.....$3.50@3.75
Fort Madison Red Head Lawn.....$3.25
Fort Madison Blue Head Lawn.....$3.00
Jackson Lawn, 20 and 30 teeth, ₱ doz., net, $4.25
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3 45
Lawn Queen, 24-tooth, ₱ doz $3.60
Paragon, 20 tooth, ₱ doz $2.75
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz. $2.98
Malleable Garden, 14-tooth, ₱ doz. $2.00

Rasps, Horse—

Disston 75%
Heller Bros.....70@5&20&10&5%
McCaffrey's American Standard .....60&10&5%
See also *Files.*
New Nicholson.....50&10&75%

Razors—

Borasic.....60 & 10%
Fox Razors, No. 42, ₱ doz. $20.00
Fox Razors, No. 44, ₱ doz, $20.00
Fox Razors, No. 87, Platina, ₱ doz. $25.00
} dis 40%

Red Devil.....60%
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%

Safety Razors—

Safety Razors.....40%
New Gem, in Tin Boxes.....₱ doz. $12.00
New Gem, Extra Blades .....₱ doz. $3.35
Gem Outfits (Razor, Strop, etc.).....₱ doz. $25.60
Complete Razor, extra Blade in Leather Case.....₱ doz. $27.00
Silberseein.....40%

Reels— Fishing—

Bishop's Independent Fish Reel Spooler, ₱ doz.....$30 00
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 12, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo.....20%
Aluminum, German Silver, Bronze.25%
1240 N, 1240 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....30%
2904 P.....33⅓%
2904 PN.....33⅓%
0924 N.....33⅓%
02084 N.....33⅓%
002904 PN.....33⅓%
802 N.....33⅓%
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....30%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July* 1, 1903.

Black Jap
White Jap
Bronzed
Nickel Plated
Electro Plated
} 70¢@70 &10%

Registers, Cash—

Sun, No. 10, Metal Cabinet.....$30.00
Sun, No. 10, Wood Cabinet.....$25.00

Revolvers—

Single Action.....85@90c
Double Action, except 44 cal.....$1.90
Double Action, 44 caliber.....$2.05
Automatic $3.60
Hammerless.....$4.10
Note.—Jobbers frequently cut the above prices of manufacturers for small trade.

Riddles, Hardware Grade

16 in., per doz.....$2.25@2.50
17 in., per doz.....$2.50@2.75
18 in., per doz.....$2.75@3.00

Rings and Ringers—

Bull Rings—

	⅝	2½	3 Inch
Steel	$0 70	0 75	0.80 doz.
Copper	1.00	1.15	1.40 doz.

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $1.25@1.50
Hill's Ringers, Gray Iron, doz. 50@55c
Hill's Ringers, Mal. Iron, doz. 70@75c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $5.25@5.50
Brown's Ringers...per doz. $0.65@ .70

Rivets and Burrs—

Copper.....30@50@5%
Iron or Steel.....75@5&75@10%

Rollers—

Acme, Stowell's Anti-Friction 50%
Barn Door, Sargent's list.....60%
Cronk's Stay .....60@25%
Cronk's Brinkerhoff.....66⅔%
Lane's Stay .....33⅓&5%
Stowell's Barn Door Stay.....₱ doz. $1.00

Rope—

Manila, 7-16 in. diam. and larger, tarred or untarred.....lb. .. @12 c
Manila, Hay, Hide and Bale Ropes, Medium and Coarse.....lb. .. @12 c
Sisal, 7-16 in. diam. and larger:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....lb. .. @ 8 c
Pure.....lb. .. @ 9¼c
Sisal, Tarred, Medium Lath Yarn:
Mixed.....lb. .. @ 7½c
Pure.....lb. .. @ 8¼c
Cotton Rope: —*Lb.*—
Best.....¼-in. and larger.. 1:@.25c
Medium..¼ in. and larger.. 16@18c
Com ..¼-in. and larger..12@13c
Jute Rope:
Thread No. 1, ¼-in. and up, lb. 6 c
Thread No. 2, ¼-in. and up, lb. 5½c
Old Colony Manila Transmission Rope, ₱ lb 17½¢

Wire Rope—

Galvanized.....47½&5%
Plain.....55&5%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute.....40&5%
Sisal.....3%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60&10@60&10@5%
Ivory.....35@10@35@10@5%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Miscellaneous.....50@50@10&10%
Combination .....55@55&10%
Stationers'.....10@10@10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60&10%
Stanley R. & L. Co.:
Boxwood .....60@60&10%
Ivory.....35@35&10&.0%
Upson Nut Co.:
Boxwood.....60@60@10%
Ivory.....35&10@35&10&10%

Sash Locks—See *Locks, Sash*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers, Sausage.*

Saw Frames—See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50%
Band .....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag 50%
One-Man Saw.....40%
Wood Saws 40%
Hand, Compass, &c.....40%
Chapin-Stephens Co.:
Turning Saws and Frames ...30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&5%
Disston's:
Circular, Solid and Inserted Tooth..50%
Band, 3 to 14 in wide.....6%
Band, ¼ to 2¾.....70%
Crosscuts.....45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35%
Woodsaw Blades.....35%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8.....25%
Hand Saws, Nos 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Keyhole, &c.....25%
Butcher Saws and Blades.....35%
C. E. Jennings & Co.'s.:
Back Saws.....25&10%
Butcher Saws.....35 &10%
Compass and Key Hole Saws.35&5&10%
Framed Wood Saws.....30&10%
Hand Saws.....20&25&10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Peace & Richardson's Hand Saws.....30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....25%
Compass, Keyhole, &c .....25@25&7½%
Wood Saws .....35@35&7½%
Wheeler, Madden & Clemson Mfg. Co.'s
Cross Cut Saws.....50%

Hack Saws—

Atkins' Hack Saw Blades A A A. ... 25%
Disston:
Concave Blades.....25%
Keystone.....40%
Hack Saw Frames.....30%
Fitchburg File Works, The Best.....25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180.... 35&5&10%
Hack Saws, Nos. 175, 180, complete. 35&5&10%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames .. 35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....35%
Sterling Hack Saw Frames.....30& 0&5%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scalers, Fish—

Bishop's Lightning .....₱ doz. $3 10
Covert's Saddlery Works .....60&10%

Scales—

Family, Turnbull's.....50@50&10%
Counter:
Hatch, Platform, ½ oz to 10 lbs, doz. $5.70
Two Platforms, ½ oz to 8 lbs, doz. $12
Union Platform, Plain..$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales.....30%
Chicago Scale Co.:
The "Little Detective," 25 lbs.....30%
Union or Family No. 2 .....60%
Portable Platform (reduced list).....50%
Wagon or Stock (reduced list).. 25@35%
Pelouze Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon.....50%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.60@2.85
Ship Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co. $6.00 .....30@30&10%
Chapin-Stephens Co., Box.....50@50&10%

Screens, Window, and Frames—

Flyer Pattern Screens...60&5@60&5&2½%
Maine Screen Frames .....40&10&5%
Perfection Screens.. ...60&5@60&5&2½%
Phillips' Screen Frames, 60&5@60&5&2½%
Porter's:
Fairview Screens.....60&5@60&5&2½%
Hummer Screens.....60&5@60&5&2½%
Klondike Screens.....6 &5@60&5&2½%
See also *Doors.*

Screws—Bench and Hand—

Bench, Iron..doz. 1 in.. $2.50@2.75 ;
1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood, Beech....doz. 30@30&5
Hand. Wood. ..... 30@30&5%
R. Hes Mfg. Co, Hand..... 30%
Chapin-Stephens Co., Hand.....30@30&10%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1. '99..... 80&5%
Coach and Lag, Gimlet Point, list Oct. 1, '99..... 80%
Hand Rail, list Jan. 1, '81. 70&10@75%

Jack Screws -

Standard List.....75&10@80&5%
Millers Falls .....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50@50&5%
Sargent.....70%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.50@50&10%
Flat or Round Head, Brass50@50&10%

Set and Cap—

Set (Iron or Steel)70&10&5% } *Extra*
Sq. Hd. Cap.....65&10&5% } *10&10*
Hex. Hd. Cap.....65&10&5% } *often*
Rd. or Fillister Hd. Cap 60% } *given.*

Wood—

List July 23, 1903.
Manufacturers' printed discounts :
Flat Head, Iron.....87½&10@.. %
Round Head, Iron.....85&10@.... %
Flat Head, Brass .....85&10@.... %
Round Head, Brass .....80&10@.... %
Flat Head, Bronze....77½&10@ ... %
Round Head, Bronze.....75&10@.. %
Drive Screws.....87½&10%

Scroll Saws—See *Saws, Scroll.*

Scythes— *Per doz.*

Clipper Pattern, Grass...$4.25@$5.00
Full Polished Clipper.....$4.75@$5.50
Grain .....$7.00@$7.50
Clipper, Grain.....$7.75@$8.25
Weed and Bush.....$4.50@$5.00

Seeders— Raisin—

Enterprise.....35@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets :
Wood Hdle., 10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools .. doz. $2.50@2.60
Aiken's Sets, Awl and Tools :
No. 20, ₱ doz. $10.00.....50&10&10%
Fray's Adj. Tool H'dls...Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....30&10%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior :
No. 1, $7.50 ; No. 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison, Three Pcs. Hoe, Rake and Shovel.....₱ doz. sets.....$9.00

Nail—

Square.....per gro. $2.25@3.50
Round, Blk. and Pol., assorted..... gro. $1.80@2.00
Octagon.....gro. $4.50@5.75
Buck Brothers.....37½%
Cannon's Diamond Point, ₱ gr. $12..25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

Rivet—

Regular list.....70&10@75%

Saw—

Aiken's:
Genuine.....50&10%
Imitation .....50&10%
Atkin's.:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....30%
Spring Hammer.....50%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 95, $15.83.....50%
No. 1 Old Style, $10.00.....50%
Special, $16.25.....50%
Giant Royal, Cross Cut .....₱ doz. $8.50
Royal, Hand. .....₱ doz. $5.00
Taintor Positive .....₱ doz $6.75

Shaving—

Fox Shaving Stick, No. 30, per doz, $24.00 net

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....63%

Shaves, Spoke—

Iron.....doz. $1.00@1.15
Wood.....doz. $1.75@2.00
Bailey's (Stanley R. & L. Co.) .....0@30&10&10%
Chapin-Stephens Co .....30@30&10&10%
Goodell's, ₱ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

Cast Iron...	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good.....	*$13.00*	*15.00*	*17 00 gro.*
Cheap.... $5.00		*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality, Jap.....70@70&10%
" Nickel.....60@60&10%
Fair qual. Jap.....80@80&5%
" Nickel.....75@75&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailors' Shears.....30%
Wilkinson's Hedge .....1900 list 45%
Wilkinson's Branch, Lawn and Border. 40%
Wilkinson's Sheep .....1900 list. 50%

Tinners' Snips—

Steel Blades .....20&5@20&10
Steel Laid Blades .....40&10@50%
Forged Handles, Steel Blades, Berlin .....40@40&10%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6¼ to 10 inch .....40&7½&10%
Niagara Snips 40%
P., S & W. Co. 20%
Triumph Pipe Shear.....₱ doz. 9.00

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....40@40&5%
Orange Shears.....50&10@50&20%
Grape .....40@10@50%
Tree Pruners.....75%
P., S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction 50%
Patent Roller Hatfield's, Sargent's list. 70&10%
Reading.....50%
R. & E. list.....33⅓%
Wrightsville Hatfield Pattern.....80%

Sliding Shutter—

Reading list.....50%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells— Shells, Empty—

Brass Shells, Empty :
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge. 65&5%
Paper Shells, Empty :
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....20&10%
Robin Hood, High Brass.....30&10%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%

Shoes Horse, Mule, &c.—

F. o. b., Pittsburg;
Iron.....per keg $3.85
Steel.....per keg 3.60
Burden's, all sizes, ₱ keg..... $3.90

Shot—

Drop, up to B, 25-lb. bag.....$1.60
Drop, B and larger, per 25-lb. bag $1.85
Buck, 25-lb. bag.....$1.85
Chilled, 25-lb. bag.....$1.85

Shovels and Spades—

Association List, Nov. 15, 1902....40%

Sieves and Sifters—

Hunter's Imitation. gro. $10.50@11.00
Buffalo Metallic tinned. S. S. Co., ₱ gr.:

14&16	16&18	18&20
$13.20	$13.50	$14.40

National Mfg. Co.:
Victor.....per gro. $12.00
Surprise.....per gro. $11.00
No Name.....per gro. $11 00
Shaker (Barler's Pat.) Flour Sifters. ₱ doz., $3.00.....30%

Sieves, Tin Rim—

Per dozen.

Mesh	*14*	*16*	*18*	*20*
Black, full size	*$1.20*	*1.25*	*1.30*	*1.35*
Plated, full size	*$1.30*	*1.35*	*1.40*	*1.45*
Black, scant		*$0.95*	*1.00*	*1.05*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.90@0.95
Mesh 20, Nested, doz..... 1.00@1.05
Mesh 24, Nested, doz ..... 1.30@1.40

Sinks—

Cast Iron—
Standard list.....60@60&10%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Skeins Wagon—

Cast Iron.....75@75&10%
Steel.....40@40&10%

Slates, School—

Factory Shipments.
"D" Slates.....40&10%
Noiseless Slates.....60&5 tens

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—

Sterling No. 10, $2.00.....33⅓

Snaps, Harness—

German.....40@40&10%
Covert Mfg. Co.:
Derby.....30&5&2%
High Grade.....45%
Jockey.....30&10%
Trojan.....45%
Yankee.....30&5&2%
Yankee, Roller.....30&5&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60 -
Triumph.....60%
Oneida Community Solid Swivel.....60%
Sargent's Patent Guarded .....66⅔&10%

Snaths—

Scythe.....44%

Snips, Tinners'—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality..... 50&10@60&5%
Cheap..... ..60@60&10%
International Silver Co.
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 77 Silver Plated Ware.....60&10%

Miscellaneous—

German Silver.....60@60&5%
Cattaraugus Cutlery Co.:
Yukon Silver.....50%
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 10&10%

Tinned Iron—

Teas.....per gro. 4.5@5.0c
Tables..... per gro. 90c@$1.00

Springs— Door—

Chicago (Coil).....40&10%
Gem (Coil).....20%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 39 in.....₱ doz. $1.10
Victor (Coil).....50&10&10%

Carriage, Wagon, &c.

1¼ in. and Wider :
Black or ⅛ Bright, lb.....4¾@5 c
Bright, lb. ..... 5¼@5½c
Painted Seat Springs :
1½ x 2 x 26, per pr.....50@55c
1½ x 2 x 28 per pr..... 60@65c
1½ x 3 x 28 and narrower, per pr. 80@85c

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....30%

Squares—

Nickel plated.... } List Jan. 5, 1900.
Steel and Iron... } 70&10@70&10&10%
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels, 50&10@50&10&10%
Disston's Try Sq. and T-Bevels.....70%
Winterbottom's Try and Miter..... 40&10@40&10&10%

Squeezers— Lemon—

Wood, Common, gro., No. 0, $5.25 @$5.50 ; No. 1. $6.25@$6.50.
Wood, Porcelain Lined.
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined.....doz. $1.75

Staples—

Barbed Blind. .....lb. 6@6½c
Electricians', Association list..... 80&10&10&10%
Fence Staples, Plain $2.25; Galvanized.....$2.55
Poultry Netting, Staples....per lb.. 3¼@3½c
Grand Crossing Tack Co.'s list....80&10%

Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
C. & A. Hoffmann's.....40%

Steelyards..... .....30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Reversible Ratchet Die Stock. 25%
Derby Screw Plates.....25%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%

Stone—

Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $3.00 per gro., 12 inch, $10.80
Norton Emery Scythe Stones:
Less than gross lots.....₱ gro. $9.00
One gross or more.....₱ gro. $7.20
Lots of 10 gross or more.... ₱ gro $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S....₱ gro. $12.00
Lamollie S. S .....₱ gro. $11.00
White Mountain S. S....₱ gro. $9.00
Green Mountain S. S....₱ gro. $6.00
Extra Indian Pond S. S.₱ gro. $7.50
No. 1 Indian Pond S. S..₱ gro. $7.00
No. 2 Indian Pond S. S..₱ gro. $4.50
Leader Red End S. S....₱ gro $4.50
Balance of 1901 list 33⅓% } 40%

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ₱ lb.
Arkansas Stone, No. 1, 3 to 5½ in. $2.80
Arkansas Stone, No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita 4 to 8 i .... 60¢
Rosy Red Washita, 4 to 8 in .... 60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list) ..... 33⅓% } 40%
Hindostan No. 1, Regular.... ₱ lb 8¢
Hindostan No. 1 Small..... ₱ lb 10¢
Axe Stones (all kinds) .....
Turkey Oil Stones, ex. 5 to 8 in. ₱ lb 80¢
Queer Creek Stones, 4 to 8 in.....20¢
Queer Creek Slips.....40¢
Sand Stone.....5¢ } 40%
Belgian, German and Swaty Razor Hones.....50%
Natural Grit Carving and Swaty Razor Hones, ₱ doz.....$3.00
Quick Edge Pocket Knife Hones, ₱ doz.....$3.00
Mounted Kitchen Sand Stone, ₱ doz.....$1.50 } 40%

Stoners— Cherry—

Enterprise.....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%
Whipple's Combination..... ₱ doz. $2 50

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....3%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 55@60c
Socket.....doz. $1.75
Excelsior Stretcher and Tack Hammer Combined, per doz. $6..... .....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, 1904.....30&5%

Sweepers, Carpet—

National Sweeper Co.: Per doz.
Auditorium, Roller Bearing (26 in case), Nickel.....$54.00
Mammoth, Roller Bearing (30 in case), Nickel.....$60.00
Marion, Roller Bearing, regular finishes, full Nickel.....$24.00
Marion Queen, Roller Bearing, full Nickel. $24.00
Monarch, Roller Bearing, Nickel...$22.00
Monarch, Roller Bearing, Jap'ned..$20.00
Transparent, Roller Bearing, Plate Glass Top, Nickel.....$36.00
Monarch Extra, Roller Bearing, (17-inch case), Nickel.....$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned.....$33.00
National Queen, Fancy Veneers..$27.00
Perpetual, Regular Bearings, Nickel..$20.00
Perpetual, Regular Bearings, Jap..$18.00
NOTE.—*Rebates:* 30c *per dozen on three-dozen lots;* $1 *per dozen on five-dozen lots;* $2 *per dozen on ten-dozen lots;* $2.50 *per dozen on twenty-five-dozen lots.*

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks.....90&10&10@....%
American Cut Tacks ..90&25@....%
Swedes Iron Tacks.90&30&10&5@....%
Swedes Upholsterers' Tacks..... 90&15&10&5@....%
Gimp Tacks.....90&15&10@....%
Lace Tacks.....90&15&10@....%
Trimmers' Tacks..90&30&10&5@....%
Looking Glass Tacks.70&10&5@....%
Bill Posters' and Railroad Tacks... 90&15&@10....%
Hungarian Nails ....30&30&5@....%
Common and Patent Brads..... 80&10&5@....%
Trunk and Clout Nails..80&10@....%
NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10&5% on Standard Weights.****

Miscellaneous—

Double Pointed Tacks. 80 &6 tens & 5%
Steel Wire Brads, R. & E. Mfg. Co.'s list.. 50&10@60%
See also *Nails, Wire.*

Tanks, Oil—

	Each.
Emerald, S. S. & Co.....30-gal	$3.25
Emerald, S. S. & Co.....60-gal.	$4.00
Queen City S. S. & Co., 30-gal.	$3.65
Queen City S. S. & Co., 60-gal.	$4.50

Tapes, Measuring—

American Asses' Skin.....40&10@50%
Patent Leather.....25@30&5%
Steel.....40@40&10%
Chesterman's.....25@25&5%
Eddy Asses' Skin.....40&10&5%
Eddy Patent Leather.....25@30&5%
Eddy Steel.....40@40&10%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger. per 100 lbs...$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire.

Single Loop..... .....8 @8½
Monitor, Cross Head, Etc.....70%

Brick Ties—

Niagara Brick Ties.....30&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White ..... 30@20&5%

Hay—

Myers' Hay Tools 50%
Stowell's Hay Carriers 50%
Stowell's Hay Forks 50%
Stowell's Fork Pulleys 50%

Saw—

Atkins' Cross Cut Saw Tools 40%
Simonds' Improved 33⅓%
Simonds' Crescent 25%

Ship—

L. & I. J. White 25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme ..... doz. $1.15@1.25; gro. $11.50@12.00
Harper, Champion or Paragon ..... doz. $1.25@1.50; gro. $13.00@13.50

Game—

Oneida Pattern ..... 75c&10@75c&10c&5%
Newmouse ..... 45@45&5%
Hawley & Norton ..... 65@65&5%
Victor (Oneida Pattern) ..... 75@75&5%
O.C Jump (Blake Pattern) 60@5@60&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes ..... 8½@9c
Mouse, Round or Square Wire ..... doz. 85@90c
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1.12½; ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3¼, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 7 $3.75 doz.
No. 5, Mouse, ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00
No. 2, ₱ gr. $30.00; Mouse, No. 3, $18.00 ..... 50%
J. M Mast Mfg. Co.: Per gro.

	Mouse.	Rat.
Blizzard	No. 12, $3.00	No. 1, $9 50
Old Nick	No. 30, 2.22	No. 2, 8.40
Joker	No. 5, 2.10	No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 2 hole, $2.40.
Imp'd Snap Shot, Mouse, per gro., 4 hole, $4.20.

Trimmers Spoke—

Bonney's Nos. 1 and 2 ..... 33⅓%
Wood's E 1 ..... 50%

Trowels—

Disston Brick and Pointing 30%
Disston Plastering 25%
Disston "Standard Brand" and Garden Trowels 35%
Kohler's Steel Garden Trowels, 5 in. ..... ₱ gro. $5.00
Kohler's Steel Garden Trowels, 6 in. ..... ₱ gro. $6.00
Never-Break Steel Garden Trowels ..... gro. $6.00
Rose Brick and Plastering ..... 25&5%
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern ..... 50&10%
Western Pattern ..... 60&10%
Handy Trucks ..... per doz. $16.00
Grocery ..... per doz. $15.00
Daisy Stove Trucks, Improved pattern ..... ₱ doz. $18.50
Model Stove Trucks ..... ₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	*$5.00*	*5.50*	*6.25*

Galvanized Wash Tubs (S. S. & Co.):

No.	1	2	3	10	20	30
Per doz., net	5.70	6.50	7.20	6.30	7 20	8.10

Twine—Miscellaneous—

Flax Twine—	*BC.*	*B.*
No. 9, ¼ and ½-lb. Balls	*22c@24c*	
No. 12, ¼ and ½ lb. balls	*18c@20c*	
No. 18, ¼ and ½-lb. Balls	*16c@18c*	
No. 24, ¼ and ½-lb. Balls	*16c@18c*	
No. 36, ¼ and ½-lb. Balls	*15c@17c*	

Chalk Line, Cotton, ½-lb Balls 30c
Cotton Mops, 6, 9, 12 and 15 lb. to doz ..... 10@12c
Cotton Wrapping 5 Balls to lb ... according to quality ..... 16c@25c
American 2-Ply Hemp, ¼ and ½-lb. Balls ..... 13@14c
American 3 Ply Hemp, 1-lb. Balls .. 13@14c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) 9c
India 3-Ply Hemp, 1-lb. Balls 9c
India 3-Ply Hemp, 1¼-lb. Balls .. 8c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls ... 9@10c
Mason Line, Linen, ½-lb. Balls ... 16c
No. 264 Mattress, ¼ and ½-lb Balls. 37c
Wool, 3 to 6 ply ..... 5¾@6c

Vises—

Solid Box ..... 50c&10@60%

Parallel—

Athol Machine Co:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Bonney's 33⅓%
Columbian Hdw. Co 40%
Emmert Universal:
Pattern Makers' No. 1 ..... $15.00
Pattern Makers' No 2 ..... $12.50
Machinist and Tool Makers' No. 4. $12.50
Fisher & Norris Double Screw ..... 15&10%
Hollands':
Machinists' ..... 40@40&5%
Keystone ..... 65&5@70%
Lewis Tool Co ..... 20@30%
Merrill's 20%
Miller's Falls ..... 60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip 20%
Parker's:
Victor ..... 20@25%
Regulars ..... 20@25%
Vulcan's ..... 40@45%
Combination Pipe ..... 55@60%
Prentiss ..... 20@25%
Sargent's 40%
Smith & Hemenway Co.:
Machinists 40%
Jewelers 33⅓%
Snediker's X. L 33⅓%
Stephens' 33⅓%

Saw Filers'—

Bonney's, No. 1, $13; No. 3, $16 ..... 40%
Disston's D 3 Clamp and Guide, ₱ dos. $30 ..... 25%
Perfection Saw Clamps, ₱ doz. $8.00
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3 ..... 45&50%

Wood Workers'—

Massey Vise Co.:
Lightning Grip 15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise 60%
Hollands' Combination Pipe ..... 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe:
87 Series 60%
187 Series ..... 60&5%
No. 870 ..... 40%

Wads—Price Per M.

B. E., 11 up	*.60c*
B. E., 9 and 10	*.70c*
B. E., 8	*.80c*
B. E., 7	*.80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B. E., 11 and larger	*$1.70@1.75*
Ely's P. E., 12 to 20	*$3.00@3.75*

Dis. 15%

Ware Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled ..... 55c&10@60%
Ground ..... 60c&10@65%
Plain or Unground ..... 65c&10@70%
Country Holloware per 100 lbs., $2 50
White Enameled Ware:
Maslin Kettles 70%
Covered Ware:
Tinned and Turned 40%
Enameled 50%
See also *Pots Glue.*

Enameled—

Agate Nickel Steel Ware ..... 50&20
Agate Nickel Steel Ware, Specials ..... 60&15%
Iron Clad Ware ..... 70&10%
Lava, Enameled ..... 40&10%
Never Break Enameled 50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*.45c*	*50c*	*55c*	*65c*

Steel Hollow Ware.

Avery Spiders & Griddles ..... 65@65&5%
Avery Kettles 60%
Porcelained ..... 50&5@50&10%
Never Break Spiders and Griddles ..... 65&5%
Never Break Kettles 60%
Solid Steel Spiders & Griddles ..... 65&5%
Solid Steel Kettles 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone ..... 40@40&10%

Washboards—

Solid Zinc: ₱ doz
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector $3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector $2.65
Cable Cross, family size, stationary protector $2.90
Single Zinc Surface:
Naiad, familysize, open back perforated $2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

Washers—Leather, Axle—

Solid ..... 80c&10@80c&10c&10%
Patent ..... 90c@90c&5%
Coil: ⅞ 1 1⅛ 1¼ *Inch.*
11c 12c 13c 14c per box

Iron or Steel—

Size bolt .... 5-16 ⅜ ½ ⅝ ¾
Washers $5.10 4.20 2.90 2.70 2.50
In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—

Over ½ inch, barrel lots, per lb 1¾@2c

Waterers, Hog—

Improved Dewey, ₱ doz $13.00

Wedges—

Oil Finish ..... lb. 2.35@2.50c

Weights—Hitching—

Covert Mfg. Co ..... 40&2%
Covert's Saddlery Works ..... 60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District $25.00
Western, Central and Southern Districts market unsettled, prices ranging from $21.00@25.00

Wheels, Well—

8-in.. $1.60@1.80; 10-in., $2.00@2.25; 12-in., $2.55@2.65; 14-in., $4.00@4.25

Wire and Wire Goods—

Bright and Annealed:
6 to 9 ..... 75@75&10%
10 to 13 ..... 75c&5@75c&10c&5%
19 to 26 ..... 75c&10c&10@80c&5%
27 to 36 ..... 75c&10c&7½@80c&2½%
Galvanized:
6 to 9 ..... 70c&5@70c&10%
10 to 18 ..... 70c&5@70c&10%
19 to 26 ..... 72½@72½c&5%
27 to 36 ..... 70@70c&5%
Coppered:
6 to 9 ..... 70c&5@70c&10%
10 to 18 ..... 70c&10@70c&10c&5%
19 to 26 ..... 72½c&10@75%
27 to 36 ..... 60@60c&10%
Annealed, Steel and Tinned, on Spools ..... 70@70c&10%
Brass & Copper on Spools 60@60c&10%
Brass, list Feb. 26, '96 ..... 30%
Copper, list Feb. 26, '96 ..... 15%
Cast Steel Wire 50%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—

List June 24, 1903 ... 90c&10c&10@ ... %

Wire Cloth and Netting—

Galvanized Wire Netting ..... 80c&10@80c&10c&5%
Painted Screen Cloth, per 100 ft. $1.25
Standard Galv. Hardware Grade:
Nos. 2, 2½ and 3 Mesh, sq. ft 3c
Nos. 4 and 5 Mesh, sq. ft 3½c
No. 6 Mesh, sq ft 3½c
No. 8 Mesh, sq ft 4c

Wire Barb—See *Trade Report.*

Wrenches—

Agricultural ..... 80c&5@80c&10c&5%
Baxter Pat'n S Wrenches ..... 70c&5@70c&10%
Drop Forged S ..... 45@45c&5%
Acme ..... 60&10%
Alligator 70%
Alligator Pattern 70%
Bull Dog 70%
Bemis & Call's:
Adjustable S ..... 35&5%
Adjustable S Pipe 40%
Brigg's Pattern ..... 30&10%
Combination Black ..... 40&5%
Combination Bright 40%
Merrick's Pattern 50%
No. 3 Pipe, Bright 55%
Boardman's 33⅓%
Coes' Genuine Knife Hdl. ..... 40&10&5&5%
Coes' Genuine Steel Hdl. ..... 40&10&5&5%
Coes' Genuine Key Model ..... 40&10&5&5%
Coes' "Mechanics' ..... 40&10&10&5&5%
Donohue's Engineer ..... 40&10%
Dudly Combination ..... 50&10&5%
Dudly Pipe ..... 50&10&5%
Dudly Adjustable Pipe ..... 40&10&5%
Eagle ..... 50&10%
Elgin Wrenches 40%
Elgin Monkey Wrench Pipe Jaws 33⅓%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots ..... 50&5%
Less than case lots 50%
Improved Pipe (W. & B.) 60%
Solid Handles, P.S. & W ..... 50@50&5%
Stillson 65%
Triumph ..... 60&10%
Vulcan Chain 50%

Fruit Jar—

T & B Fruit Jar Wrenches ..... ₱ gro $9.00
Triumph Fruit Can Wrenches, ₱ gro $9.60
Triumph Fruit Jar Holders .. ₱ gro. $15.00

Wrought Goods—

Staples, Hooks, &c., list March 17 '02 ..... 90@90c&5%

Yokes Neck—

Covert Saddlery Works, Trimmed 70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers & Freighters' .. list net

Zinc—

Sheet ..... per 100 lbs. $6.25@6.50

PAINTS, OILS AND COLORS.

White Lead, Zinc, &c.

Lead, English white, in Oil	9¼@ 9¼
Lead, American White, in Oil:	
Lots of 500 ℔ or over	@ 6¼
Lots less than 500 ℔	@ 7
In Barrels	@ 6
Lead, White, in oil, 25 ℔ tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price	@ 1½
Lead, American, Terms: For lots 12 tons and over ¼c rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice; for lots of less than 500 lbs. net.	
Lead White, Dry in bbls	@ 6
Zinc, American, dry	₱ ℔ 4½@ 4¾
Zinc, Paris, Red Seal, dry	@ 8½
Zinc, Paris, Green Seal, dry	@ 9¼
Zinc, Antwerp Red Seal, dry	@ 6¾
Zinc, Antwerp, Green seal, dry	@ 8¼
Zinc, V. M. French, in Poppy Oil, Green Seal:	
Lots of 1 ton and over	12 @12¼
Lots of less than 1 ton	12¼@12¾
Zinc, V. M French, in Poppy Oil, Red Seal:	
Lots of 1 ton and over	10¾@11¼
Lots of less than 1 ton	11@11½

Discounts.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors.

Black, Carbon	₱ ℔ 5 @10
Black, Drop, Amer	4 @ 6
Black, Drop, Eug	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	₱ ℔ 4 @ 6
Blue, Chinese	29 @32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	₱ ℔ $3.50@3.75
Green, Chrome, ord'nary	3½@ 6
Green, Chrome, pure	17 @25
Lead, Red, bbls. ½ bbls. and kegs:	
Lots 500 ℔ or over	@ 6½
Lots less than 500 ℔	@ 7
Litharge, bbls. ½ bbls. and kegs:	
Lots 500 ℔ or over	@ 6½
Lots less than 500 ℔	@ 7
Ocher, American	₱ ton $8.50@16.00
Orcher, American Golden	2½@ 3
Orcher, French	₱ ton 1¾@ 2½
Orcher, Foreign Golden	3 @ 4
Orange Mineral, English	₱ ℔ 9 @11
Orange Mineral, French	10¾@11¼
Orange Mineral, German	6¾@ 9
Orange Mineral, American	8 @ 8½
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3½
Red, Turkey, English	4 @ 6
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 ℔ .80@1.50
Red Venetian, English	₱ 100 ℔ 1.25@1 75
Sienna, Italian, Burnt and Powdered	₱ ℔ 3 @ 6½
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	₱ ℔ 1½@ 2
Talc, French	₱ ℔ 1 @ 1½
Talc, American	75 @1.25
Terra Alba, French	₱ 100 ℔ .95 @1.00
Terra Alba, English	.95 @1.00
Terra Alba, American No. 1	.65 @85
Terra Alba, American No. 2	.45 @50
Umber, Turkey, Bnt. & Pow.	₱ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd.	2½@ 3½
Umber, Bnt. Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow, Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@70
Vermilion, Quicksilver, bags	@71
Vermilion, English, Import	.80 @85
Vermilion, Chinese	@0.90@1.00

Colors in Oil.

Black, Lampblack	12 @14
Blue, Chinese	36 @45
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	13 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

Miscellaneous.

Barytes, White Foreign	₱ ton $17.50@20.00
Barytes Amer. floated	18.50@20.00
Barytes, Crude, No. 1	10.00@11.00
Chalk, in bulk	₱ ton 3.00@ 3.25
Chalk, in bbls	₱ 100 ℔ @ 35
China Clay, English	₱ ton 11.00@17.00
Cobalt, Oxide	₱ 100 ℔ 2.50@ ...
Whiting, Common	₱ 100 ℔ .45@ .48
Whiting, Gilders	.55@ .57
Whiting, extra Gilders'	.58@ .60

Putty.

In bladders	1¾@2¼
In bulk	1¼@2
In cans 1 ℔ to 5 ℔	2½@4½
In cans 12½ ℔ to 25 ℔	1½@2¼

Spirits Turpentine.

In Oil bbls	.58 @58½
In machine bbls	58½@59

Glue.

Cabinet	₱ ℔ 11 @15
Common Bone	.6 @ 8
Extra White	.18 @24
Foot Stock, White	.11 @14
Foot Stock, Brown	.7 @10
German Hides	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.8 @11
Medium White	.14 @17

Gum Shellac—Cts. per lb.

Bleached, Commercial	43 @
Button	50 @60
Diamond T	60 @
Fine Orange	53 @58
A. C. Garnet	46 @
D. C	35 @
T. N	50 @51
V. S. O	63 @65

Animal, Fish and Vegetable Oils.

Linseed, City, raw	₱ gal. .42 @43
Linseed, City, boiled	.44 @45
Linseed, State and West'n, raw	39 @40
Linseed, raw Calcutta seed	@65
Lard, Prime, Winter	61 @62
Lard, Extra No. 1	.51 @52
Lard, No. 2	.39 @40
Cotton-seed, Crude, f.o.b mills	.28 @29
Cotton-seed, Summer Yellow, prime	.35½@36½
Cotton-seed Summer Yellow, off grades	34½@35
Sperm, Crude	@55
Sperm, Natural Spring	.61 @62
Sperm, Bleached Spring	.63 @66
Sperm, Natural Winter	.65 @66
Sperm, Bleached Winter	.67 @68
Tallow, Prime	.49 @50
Whale, Crude	@ ...
Whale, Natural Winter	.46 @47
Whale Bleached Winter	.48 @49
Menhaden, Brown, Strained	.31 @32
Menhaden, Light, Strained	.32 @33
Menhaden, Bleached Winter	.34 @35
Menhaden, Ex Bleached Winter	36 @37
Cocoanut, Ceylon	6½@ 6½
Cocoanut, Cochin	7½@ 7½
Cod, Domestic	.39 @40
Cod, Newfoundland	.40 @41
Red Elaine	.44 @45
Red Saponified	₱ ℔ 5 @ 5½
Olive, Italian, bbls	.50 @ 52
Neatsfoot prime	.54 @ ...
Palm, prime, Lagos	₱ ℔ 6½@ 6½

Mineral Oils.

Black, 20 gravity, 25@30 cold test	₱ gal. .13 @14
Black, 29 gravity, 15 cold test	.14 @15
Black, Summer	.13 @14
Cylinder, light filtered	20½@21½
Cylinder, dark filtered	18½@19½
Paraffine, 905-907 gravity	15 @15½
Paraffine, 903 gravity	14 @14½
Paraffine, 885 gravity	11¾@12¾
Paraffine, red, In small lots ½¢ advance.	14 @15½

CURRENT METAL PRICES.

APRIL 6, 1904.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:	
1 to 1¾ in. round and square	@1.80¢
1½ to 4 in. x ⅜ to 1 in.	@1.80¢
1½ to 4 in. x ¼ to 5-16	@2.00¢
Rods—⅝ and 11-16 round and square	@2.00¢
Angles:	Cts ₱ lb
3 in. x ¼ n. and larger	2.15¢
3 in. x 3-16 in and ⅛ in.	2.25¢
1¼ to 2½ in. x ¼ in	2.05¢
1½ to 2¾ in. x 3-16 in and thicker	2.00¢
1 to 1¼ in. x 3-16 in	2.05¢
1 to 1¼ x ⅛ in	2.10¢
⅞ x ¼ in	2.25¢
⅞ x ⅛ in	2.35¢
⅝ x ⅛ in	3.15¢
½ x 3-32 in	3.65¢
Tees:	
1 in	2.15¢
1¼ in	2.25¢
1½ to 2¾ in.	2.15¢
3 in. and larger	2.40¢
Beams	2.35¢
Channels, 3 in. and larger	2.35¢
Bands—1½ to 6 x 3-16 to No. 8	₱ lb 2.10¢
"Burden's Best" Iron, base price	₱ lb 3.05¢
Burden's "H. B. & S. Iron, base price	₱ lb 2.85¢
"Ulster"	₱ lb 3.10¢
Norway Bars	3.25@3.75¢
Norway Shapes	3.75@4.25¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.85¢
Toe Calk, Tire and Sleigh Shoe	2.00@2.50¢
Best Cast Steel, base price in small lots	7¢

Soft Steel Sheets—

¼ inch	2.30¢	No. 14	2.45¢
5-16 inch	2.30¢	No. 16	2.55¢
No. 8	2.30¢	No. 18	2.65¢
No. 10	2.35¢	No. 20	2.65¢
No. 12	2.40¢	No. 22	2.70¢

Sheet Iron from Store.

Black.

	One Pass, C. R. Soft Steel	R. G. Cleaned.
No 14	₱ lb 2.35	2.50¢
No. 16	₱ lb 2.45	2.60¢
Nos. 18 to 21	₱ lb 2.55	2.70¢
Nos. 22 to 24	₱ lb 2.60	2.80¢
Nos. 25 and 26	₱ lb 2.65	2.90¢
No. 27	₱ lb 2.70	3.00¢
No. 28	₱ lb 2.80	3.10¢

Russia, Planished, &c.

Genuine Russia, according to assortment	₱ lb 11¾@14¢
Patent Planished	A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16	₱ lb, 2.85¢
Nos. 18 to 20	₱ lb, 3.00¢
Nos. 22 to 24	₱ lb, 3.35¢
No. 26	₱ lb, 3.56¢
No. 27	₱ lb, 3.80¢
No. 28	₱ lb, 4.04¢
No. 30	₱ lb, 4.99¢

No. 20 and lighter, 36 inches wide, 25¢ higher.

Foreign Steel from Store—

Best Cast	₱ lb 15 ¢
Extra Cast	₱ lb 18 @ 20 ¢
Swaged, Cast	₱ lb 16 ¢
Best Double Shear	₱ lb 15 ¢
Blister, 1st quality	₱ lb 13 ¢
German Steel, Best	₱ lb 10 ¢
2d quality	₱ lb 9 ¢
3d quality	₱ lb 8 ¢
Sheet Cast Steel, 1st quality	₱ lb 15 ¢
2d quality	₱ lb 14 ¢
3d quality	₱ lb 12 ¢
R. Mushet's "special"	₱ lb 46 ¢
" " "Titanic"	₱ lb 19 ¢
Hobson's Choice XX Extra Best	₱ lb 35 ¢
Jessop Self Hardening	₱ lb 45 ¢
Seamans' "Nelson" Steel	40 ¢
Hobson's "Soho" Special Self-Hardening	₱ lb 43 ¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per ₱ lb
Banca, Pigs	@29½¢
Straits, Pigs	@29½¢
Straits in Bars	29½@30½¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.85
Melyn Grade:	
IC, 14 x 20	6.10
IX, 14 x 20	7.35
Allaway Grade:	
IC, 14 x 20	5.10
IX, 14 x 20	6.20

American Coke Plates—Bessemer—

IC, 14 x 20 108 lb	$4.25
IX, 14 x 20	$5.25

American Terne Plates—

IC, 20 x 28	$8.30
IX, 20 x 28	$10.30

Copper—

DUTY: Pig, Bar and Ingot and Old Copper free. Manufactured, 2½¢ ₱ lb.

Ingot—

Lake	13¾@14 ¢
Casting	13¾@13¾¢

Sheet and Bolt—

October 22, 1903. Net

Prices, in cents per pound.

Sheet 30 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, 50 lb. sheet, 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lb.	24 oz. to 32 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 11¼ lb.	12 oz. and 13 oz. 9⅜ to 10 lb.	10 oz. and 11 oz. 7½ to 8¼ lb.	8 oz. and 9 oz. 6¼ to 7½ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	18	19	19	19	20	21	23	25	28
30	96	72	18	19	19	19	20	22	25	28	
30	.....	96	18	19	19	19	21	25			
36	72	.....	18	19	19	19	21	23	26	29	
36	96	72	18	19	19	19	21	25	28		
36	120	96	18	19	19	20	22				
36	.....	120	18	19	19	21					
48	72	.....	18	19	19	21	23	26	29		
48	96	72	18	19	19	22	24	27			
48	120	96	18	19	21	23	27				
48	.....	120	18	20	22	25					
60	72	.....	19	19	20	22	25	30			
60	96	72	18	19	21	23	26				
60	120	96	18	20	22	25					
60	.....	120	18	21	23	27					
72	96	.....	18	22	22	27					
72	120	96	18	21	24	29					
72	.....	120	19	22	27						
108	96	.....	19	22	25						
108	120	96	20	23	26						
108	.....	120	21	24	28						
wider than 108	132	120	20	25							
	.....	132	23	24							

Circles, Segments and Pattern Sheets, 3¢ ₱ lb advance over price of sheet Copper required to cut them from. Cold or Hard Rolled Copper. 14 oz. ₱ square foot and heavier, 1¢ ₱ lb over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 oz. ₱ square foot, 2¢ ₱ lb over the foregoing prices.
All Polished Copper, 20 in. wide and under, 1¢ ₱ lb advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ ₱ lb advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₱ lb more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₱ lb	21¢
12 oz. and up to 14 oz. to square foot, ₱ lb	21¢
10 oz. and up to 12 oz., ₱ lb	20¢
Lighter than 10 oz., ₱ lb	19¢

Circles less than 8 in. diameter, 2¢ ₱ lb additional
Circles over 13 in. diameter are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1¢ ₱ lb extra.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.
Last Feb. 23, 1901.

Nos. 0000 to 8	9 and 10		11 and 12
Base	¼¢		¼¢ ₱ lb adv.
Nos. 13	14	15	16
¼¢	⅜¢	½¢	1¼¢ ₱ lb adv.
Nos. 17	18	19	20
1¼¢	2¢	2¼¢	2¾¢ ₱ lb adv

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.
Feb. 19, 1904. Net. Outside Diameter.

Stubs' W. G.	B. & S. W. G.	⅛	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-11	3- 9	...	.....	..	.....	..	.....	..	..	..	..	18	18
12	10	...	.....	..	.....	..	.....	24	24	23	23	18	18
13	11	...	.....	..	.....	..	.....	25	25	23	23	18	18
14	12	...	.....	..	.....	25	25	25	23	23	23	19	19
15	13	...	.....	..	26	25	25	25	23	23	23	19	19
16	14	...	.....	26	26	25	25	25	23	23	23	20	20
17	15	...	29	26	26	25	25	25	23	23	23	21	21
18	16	49	31	27	27	26	26	26	24	24	24	22	22
19	17	58	31	27	27	26	26	26	24	24	24	23	23
20	18-19	62	31	27	27	26	26	26	24	24	24	24	24
21	20	62	47	29	28	28	26	25	25	25	25	25	25
22	21	67	52	31	31	29	29	27	26	26	26	26	26
23	22	74	57	33	33	31	31	29	29	29	29	29	29
24	23	77	62	49	44	42	41	41	39	37	36	36	37
25	24	82	67	53	47	45	43	42	41	40	40	41	42

Copper Bronze and Gilding Tube, 3¢ ₱ lb additional

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
36	32	29	27	21	21	21	21	21	21	21	23	23	25	27	28¢ ₱ lb

Copper, Bronze or Gilding Tubes, 3¢ ₱ lb additional

Brazed Brass Tubing.

(*To No.* 19, *inclusive.*) June 6, 1898.
Brown & Sharpe's gauge standard.

	Per lb.
Plain Round Tube, ¼ in. up to 2 in.	$0.35
" " ⅛ " ¼ "	.36
" " ¼ " ⅜ "	.38
" " ⅜ " ½ "	.41
" " ½ " 5-16"	.48
" " 5-16" ⅜ "	.65
" " ⅜ " ½ "	1.00
" " ½ " 3-16"	1.50
Smaller than ⅛ inch	Special
⅛ inch to 3 inch, to No. 19, inclusive	.38
3 inch	.40
Over 3 inch to 3½ inch, inclusive	.45
Over 3½ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.
Discount from list 5%. 25%

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass— Wider than and including	in. 2 12	in. 12 14	in. 14 16	in. 16 18	in. 18 20	in. 20 22	in. 22 24	in. 24 26
To No. 20 inclusive	.22	.23	.25	.27	.29	.31	.33	.36
Nos. 21 22, 23 and 24	.23	.24	.26	.28	.30	.32	.34	.37
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38
Nos. 27 and 28	.23	.25	.28	.30	.32	.34	.36	.39

Common High Brass. Wider than and including	in. 26 28	in. 28 30	in. 30 32	in. 32 34	in. 34 36	in. 36 38	in. 38 40	in. 40
To No. 20, inclusive	.39	.42	.46	.50	.55	.60	.65	*
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68	
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71	
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75	

* Special prices not less than 80 cents.
Add ½¢ ₱ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 25%

Wire in Coils. List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gilding bronze and copper
All Nos. to No. 10, inclusive	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.52	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.82
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.25
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 25%; Copper Wire, NET.
List November 16, 98.
Spring Wire, 2¢ ₱ lb advance.

Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₱ lb, net	18¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₱ lb net	19¢

Other sizes and extreme lengths, special prices.

Spelter—

Duty: In Blocks or Pigs, 1¢ ₱ lb

Western Spelter	5¾@5¾¢

Zinc.

Duty: Sheet, 2¢ ₱ lb.

No. 9, base casks	6¾¢
Open per, lb	7¼¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₱ lb. Pipe and Sheet., 2½¢ ₱ lb.

American Pig	5@5¼¢
Bar	5¾@6¢
Pipe	₱ lb 5@5¼¢
Tin Lined Pipe	₱ lb 12¢
Block Tin Pipe	₱ lb 40 ¢
Sheet Lead	₱ lb 5¾@6 ¢
Old Lead in exchange, 3¾¢ ₱ lb	

Solder.

½ & ¼ guaranteed	18½@19 ¢
No. 1	16½@17 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₱ lb.

Cookson	₱ lb 8¼@8¾¢
U. S	6½@6¾¢
Hungarian	6½@6¾¢

Aluminum—

Duty: Crude, 8¢ ₱ lb. Plates, Sheets, Bars and Rods, 13¢ ₱ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:	
Small lots	₱ lb 37¢
100-lb lots	₱ lb 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:	
Small lots	₱ lb 34¢
100-lb lots	₱ lb 33¢

Aluminum Sheet, B. & S. gauge, 50 lb or more	6-in. ₱ lb.	14-in. ₱ lb.	24-in. ₱ lb
Wider than			
And including	14-in.	24-in.	30-in.
Nos. 13 to 19	$0.43	$0.44	$0.47
No. 20	.44	.44	.49
Nos. 21 to 23	.46	.48	.51
No. 24	.46	.50	.53
No. 25	.47	.51	.54
No. 26	.47	.54	.59
No. 27	.48	.57	.62
No. 28	.48	.57	.64
No. 29	.49	.60	.69
No. 30	.50	.64	77

Note.—Lots of less than 50 lb 5¢ ₱ lb extra.

Aluminum Wire, B. & S. Gauge.			
Larger than No. 9	₱ lb 40¢	No. 15	₱ lb 43¢
No. 9 to No. 10	₱ lb 40½¢	No. 17	₱ lb 50¢
No. 11	₱ lb 41 ¢	No. 18	₱ lb 55¢
No. 12	₱ lb 41½¢	No. 19	₱ lb 60¢
No. 13	₱ lb 42 ¢	No. 20	₱ lb 65¢
No. 14	₱ lb 42½¢	No. 21	₱ lb 85¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₱ lb 10¼¢
Light and Tinned Copper	₱ lb 9¾¢
Heavy Brass	₱ lb 7½¢
Light Brass	₱ lb 5½¢
Lead	₱ lb 4½¢
Tea Lead	₱ lb 3½¢
Zinc	₱ lb 3½¢
No. 1 Pewter	₱ lb 17 ¢
No. 2 Pewter	₱ lb 8 ¢
Pure Aluminum, Sheet, ₱ lb	21¢
Cast Aluminum, ₱ lb	16¢
Tin Plate scrap	₱ ton $4 50@5 00
Wrought Scrap Iron	₱ gross ton $13.00@13.50
Heavy Cast scrap	₱ gross ton $11.00@11 50
Stove Plate Scrap	₱ gross ton $8.50@ 9.00
Burnt Iron	₱ gross ton $6.00@ 6.50